MAR 1 1925

AMERICAN JOURNAL of PHARMACY

SINCE 1825

A Record of the Progress of Pharmacy and the Allied Sciences

COMMITTEE ON PUBLICATION.

Charles H. LaWall, Ph. M., Sc. D. Joseph W. England, Ph. M. J. W. Sturmer, Pharm. D.
John K. Thum, Ph. M. Arno Viehoever, Ph. D. E. Fullerton Cook, Ph. M.
IVOR GRIFFITH, Ph. M., Editor
Henry Leffmann, A. M., M. D., Special Contributor

Vol. 97 FEBRUARY, 1925 No. 2

CONTENTS

Editorial:

Oddities From Old Books 63

The Headquarters Building 65

Original Articles:

The Electro-Dialysis of Agar. By Ellery H. Harvey, Madison, Wis. 66

Tablet Coating. By Edward S. Rose, Iowa City, Iowa 71

The History of Chemical Symbols. By Henry Leffmann, Philadelphia ... 77

Concerning Solution of Magnesium Citrate. By Wilbur M. Scoville, Detroit, Mich. 80

"Pharmacy—As Was and Is." A Play. By Robert J. Ruth, Philadelphia, 84

Abstracted and Reprinted Articles:

The Iodine Cycle. By Dr. Th. v. Fellenberg, Bern, Switzerland. (Translated by Henry Leffmann) 107

Obituary:

Thomas De Armond McElhenie (Portrait) 109

Scientific and Technical Abstracts 112

News Items and Personal Notes 116

Book Reviews 119

Price $3.00 per Annum in Advance. Foreign Postage, 25 Cents Extra.
Single Numbers, 30 Cents. Back Numbers, 50 Cents.

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa., Under the Act of March 3, 1879.

Acceptance for Mailing at Special Rate of Postage Provided for in Section 1103, Act of October 3, 1917. Authorized February 15, 1920.

PUBLISHED MONTHLY BY THE

Philadelphia College of Pharmacy and Science

145 North Tenth Street, Philadelphia

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

MANUSCRIPTS should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

Contributors are allowed a reasonable number of copies of this JOURNAL, free of charge, if applied for when the proof is returned.

REPRINTS, if desired, must be applied for when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the JOURNAL. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, etc. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.	COVERS WITH TITLES	
25 copies.....	$2.25	$3.75	$7.75	$9.00	25 copies.....	$1.75
50 "	2.50	4.00	8.25	9.75	50 "	2.00
100 "	2.75	4.25	9.00	10.75	100 "	2.25
250 "	3.75	4.75	10.00	12.00	250 "	2.75

☞Our readers will find it to their advantage to carefully consult the advertising pages when desiring to correspond with STRICTLY FIRST-CLASS PARTIES.

THE AMERICAN
JOURNAL OF PHARMACY

VOL. 97. FEBRUARY, 1925. NO. 2.

EDITORIAL

ODDITIES FROM OLD BOOKS.

Always there is an agreeableness to old books. It is not merely the antiquity of them, but their delightful candor and the leisurely lilt of their composition that gives them their entrancing charm. Certainly they have originality also, for they were gathered together in days when the world was fallow with the apparent, yet unexplained.

Then mark the naivete—and often the conceit wherewith they speak of certain matters—sometime of considerable moment but now, perhaps, of no account. Their fads and fancies and fripperies and fallacies—how well they show the changelessness of human traits. How well they demonstrate the oft-returning cycles of scientific progress—the ebb and flow of the civilizing tides—as if the passage of generations were but the swing-swang of the second's pendulum—ever swinging but ever returning back whence it came.

Of all the old books where comfort lurks, it is the old herbals and medicine books that bring us the greatest delight. Is it any wonder that this is so when a mere browsing through a few grants us reading such as this:

> "BASIL VALENTINE, a German Benedictine monk, led the way to the internal administration of metallic medicine, by a variety of experiments on the nature of *Antimony*, and in his *'Currus Triumphalis Antimonii,'* a work written in high Dutch, he has described a number of the combinations of that metal. If however we may credit a vague tradition, he was extremely unfortunate in his first experiments upon his brother monks, all of whom he injured if not killed; those who have keen ears for etymological sounds will instantly recognise, in this circumstance, the origin of the word *Antimony*,—Ante-monks."

and this:

> "In the year 1226, ROGER BACON, a native of Ilchester in Somersetshire, and a Franciscan monk of Westminster Abbey,

laid the foundations of chymical science in Europe; his discoveries were so extraordinary that he was excommunicated by the Pope, and imprisoned ten years for supposed dealings with the devil; it appears that he was a believer in a universal Elixir, for he proposed one to Pope Clement the Tenth, which he extolled highly, as the invention of Petro de Maharncourt.

"This wonderful man was succeeded at the end of the same century by Arnoldus de Villa Nova, a Frenchman, or as others assert, a Spaniard, who deserves to be noticed on this occasion, as being the first to recommend the distilled spirit of wine, impregnated with certain herbs, as a valuable remedy; from which we may date the introduction of *Tinctures* into medical practice; for, although Thaddæus, a Florentine, who died in 1270, at the age of eighty, bestows great commendation upon the virtues of *Spirit of Wine*, yet he never used it as a solvent for active vegetable matter."

From another source:

"The question however is unimportant, for the *Stibium* was never used but as an external astringent, especially for the purpose of contracting the eyelids, and thereby of making the eyes appear very large, which has been considered from the most remote antiquity, as a feature of great beauty; Juno's large eyes came thus, said Homer. This practice appears also to have been followed by the Jews for Jezebel is said to have painted her eyebrows to make the eyes appear big; the expression also shows that the drug employed was the *Stimmi*."

One old book tells us that:

"Strabo says that the Iberians, near neighbours of the Colchians, used to receive the gold, brought down from the high lands by the torrents, into sieves and sheep skins, and that from thence arose the fable of the golden fleece. Dionysius, of Mytilene, offers a different explanation of the fable, and supposes it to allude to a book *written on skins*, and containing an account of the process of *making gold* according to the art of alchymy."

Reading on, though somewhat handicapped by the coiling smoke of an ancient pipe, it is a quaint conceit that one gathers from this intolerant quotation:

"In England, it is said that the smoking Tobacco was first introduced by Sir Walter Raleigh on his return from America. James the First wrote a philippic against it, entitled a "COUNTER-

BLASTE TO TOBACCO," in which the royal author, with more prejudice than dignity, informs his loving subjects that 'it is a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs; and in the black stinking fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomless.' In 1604 this monarch endeavored by means of heavy imposts to abolish its use in this country, and in 1619 he commanded that no planter in Virginia should cultivate more than 100 lbs. It must be confessed that some legislative enactment was necessary at this period for restricting the custom of smoking Tobacco, for we are told in the *Counterblaste,* that many persons expended as much as five hundred pounds per annum in the purchase of this article, which in those days was an enormous amount.

"In 1624 Pope Urban the VIIIth published a decree of excommunication against all who took snuff in the church. Ten years after this, smoking was forbidden in Russia, under the pain of having the nose cut off; in 1653 the Council of the Canton of Appenzel cited smokers before them, whom they punished, and they ordered all innkeepers to inform against such as were found smoking in their houses. The police regulations of Bern made in 1661 was divided according to the Ten Commandments, in which the prohibition of smoking stands immediately beneath the command against adultery; this prohibition was renewed in 1675, and the Tribunal instituted to put it into execution—viz.; CHAMBREAU TABAC—continued to the middle of the eighteenth century, Pope Innocent the XIIth, in 1690, excommunicated all those who were found taking snuff or tobacco in the church of St. Peter at Rome; even so late as 1719 the Senate of Strasburgh prohibited the cultivation of Tobacco from an apprehension that it would diminish the growth of corn; Amurath the IVth published an edict which made smoking Tobacco a capital offence; this was founded on an opinion that it rendered the people infertile."

Truly there is an agreeableness to old books.

IVOR GRIFFITH.

THE HEADQUARTERS BUILDING.

Slowly put surely, as the returns come in and the possibilities are checked up the Headquarters Building for American Pharmacy is looming up as a definite reality. Those who have never been connected with organized efforts to raise money for a building or an endowment, those who are merely the contributors, have no realization of the amount of self-sacrificing work that is done by the

individuals who direct the campaign. Then, too, there is gratification at the size of the fund that has been pledged. No professional or scientific organization has ever done the like before—to obtain pledges aggregating nearly half a million dollars without the need of selling bonds is an unusual achievement in itself.

At the next meeting of the A. Ph. A. in Des Moines, in August, we should be prepared to plan our building, select the site and then, on the basis of a project actually under way, have a whirlwind clean-up which will assure us of an adequate endowment for its perpetual upkeep in spite of fluctuations in membership or other causes of variation in income.

But the Building will do more than this. It will center the eyes of the professional and scientific world upon pharmacy and will add new lustre to our organization which has done so much for pharmacy in the past and can still do so much more for pharmacy in the future.

All Hail the Headquarters Building for American Pharmacy; May, 1925, see the conclusion of our intensive efforts and the consummation of our hopes and dreams.

CHARLES H. LAWALL.

ORIGINAL ARTICLES

THE ELECTRO-DIALYSIS OF AGAR.

Ellery H. Harvey.

Many facts concerning the composition and chemistry of agar are scattered through the literature but in most cases the data are not comparable because of the variability of the material from sample to sample. Of the impurities common to agar the most important from a colloidal point of view are the inorganic salts. To properly appraise an agar-water system electrolytes should be absent. This report concerns itself with an attempt to prepare ash-free agar, preliminary to a survey of its physio-chemical properties.

The raw material consisted of U. S. P. Agar in the form of yellowish-white shreds, having a moisture content of 21.36%, ash

of 3.75% on a moisture-free basis and a pH value of 4.05 in a hot 1% solution.

One hundred grams of finely cut agar were added to 3000 cc. of 0.5% acetic acid, thoroughly mixed and allowed to stand thirty minutes. The supernatant liquor was poured off and the swollen agar added to a fresh quantity of 0.5% acetic acid. After standing thirty minutes the supernatant liquor was poured off and the agar soaked in six changes of distilled water during twelve hours. Considerable dirt was thus floated off and the agar brought to a neutral reaction.

The agar was added to 3000 cc. of distilled water and the whole heated just sufficiently to produce a uniform colloidal dispersion. The hot sol was poured into the dialyzing apparatus illustrated diagramatically in Figure 1.

The set-up consisted essentially of a large galvanized box which served as the water bath, into which was placed a large glass battery jar; the water bath was held at 50°C. by means of a 500-watt lamp connected through a relay to a thermo-regulator; a stirrer driven by an electric motor kept the water in circulation. In the battery jar at opposite ends was placed two Electros Filtros cells within which the platinum electrodes were suspended. The agar sol was poured outside the cells and sufficient water in the cells to almost cover the electrodes. Due to electro-endosmose it was necessary to add distilled water to one cell and siphon it out of the other; this was taken care of automatically by the use of a constant-level apparatus (not shown).

To prevent bacterial decomposition the agar was kept covered with C. P. Toluene. One hundred ten volt direct current was passed through the cells at an amperage of 0.2-0.3. After twelve hours, with no stirring of the agar, it separated into a flocculent bottom layer and a clear supernatant layer. The latter was carefully siphoned off, filtered with suction through filter paper and then supercentrifuged at 40,000 r. p. m. Because of entrained air the liquid came through the centrifuge looking milky. By keeping the agar sol hot the air was driven out on standing and a clear, transparent liquid was obtained which gelled quickly at room temperature.

The residue remaining in the bowl of the centrifuge consisted of diatoms, spicules of silica and non-characterizable debris.

The purified portion was poured into shallow containers and placed in a Serum Dryer at 40°C. to dry. Rapid drying gave agar

closely resembling sheet gelatin in appearance. Slow drying gave an amber colored product.

The ash content was determined on a bone-dry sample. A drop of nitric acid was added and the ash re-ignited. On a moisture free basis the ash content was 0.81%, a reduction of 2.94%.

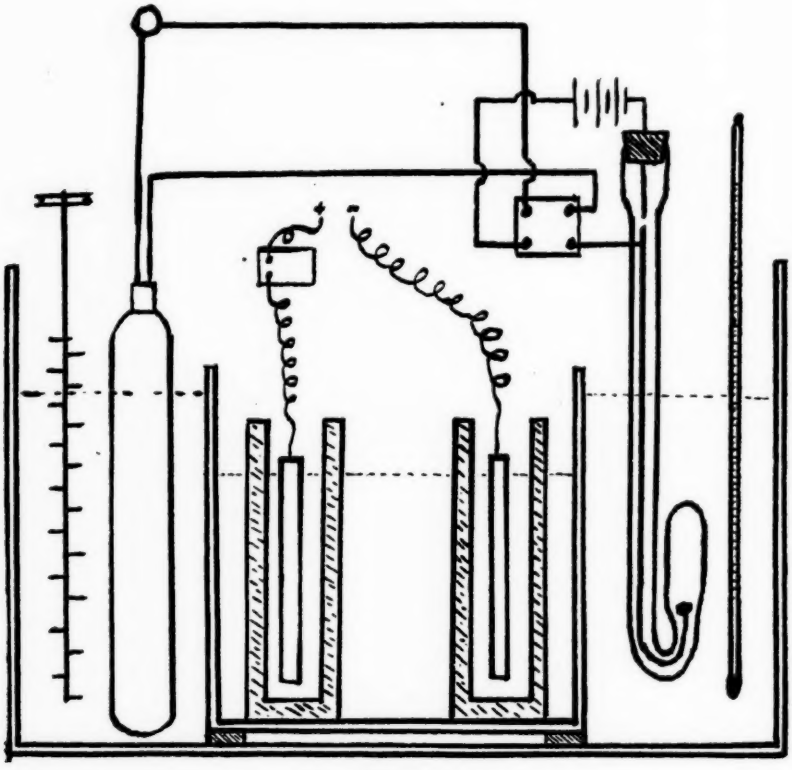


Figure 1.

In an effort to reduce the ash content to a lower value several additional determinations were made, varying a number of the conditions described above. One per cent. acetic acid was substituted for 0.5%. The agar was found to be slightly acid when brought to the sol condition although tests with litmus after washing showed no acidity. The final product did not gel to as firm a consistency and the ash content was no lower, *i. e.*, 0.82%. In a third run the agar was soaked in distilled water only. The current had to be passed for a much longer time before separation occurred and the

ash was higher, 0.97%. In all cases the ash was a reddish color resembling iron oxide. Doubling the time of dialysis did not lower the ash content.

Collodion cells and parchment cells were substituted for the Electros Filtros cells but no further reduction was obtained. A material increase in the time of dialysis might give lower results.

The "reduced-ash" agar had the following characteristics: Physical appearance of high grade sheet gelatin; moisture content of 12.28%; ash content of 0.81% on a moisture-free basis; pH value of 4.9 in a hot 1% sol.

Electrical Charge on Agar.

A dilute "reduced-ash" agar hydrosol was subjected to kataphoresis, using the ordinary U tube and platinum electrodes. Agar was found to be electro-negative.

Effect of pH on Viscosity.

A 1% "reduced ash" agar sol was made, the pH varied and the corresponding viscosity taken at 45°C. with an Ostwald viscosimeter. Several determinations made at a temperature less than 40°C. gave erratic results due to the tendency of the agar to gel. Table I indicates that the agar sol reaches a maximum viscosity at the point of neutrality.

TABLE I.

pH.	*Relative Viscosity.*
2.3	1.16
4.9	1.23
7.1	1.26
8.6	1.25
9.5	1.22
10.7	1.16

Effect of Salts on Viscosity.

One gram of "reduced ash" agar was dissolved with heat in 0.1, 0.2, and 0.3% solutions of the respective salts. The sols were adjusted for evaporation losses and the viscosities taken in an Ostwald viscosimeter at 45°C. The salts chosen were the sulphates of mono-, di-, and tri-valent metals yielding neutral solutions with water. The results indicate that as the percentage of the neutral salt is increased the viscosity is decreased.

TABLE II.

Concentration of potassium sulphate	0.05%	0.1%	0.2%	0.3%
Relative viscosity	1.19	1.184	1.182	1.180
Concentration of magnesium sulphate	0.05	0.1	0.2	0.3
Relative viscosity	1.17	1.166	1.162	1.160
Concentration of aluminum sulphate	0.05	0.1	0.2	0.3
Relative viscosity	1.15	1.144	1.142	1.140

This phenomena has been investigated by Kruyt and de Jong[1] who attribute the action to a discharge based on an electro-viscous effect. The agar sol being weakly negatively charged undergoes a reversal of charge due to the electrolyte, the valency of the anion exercising no influence while that of the cation being the deciding factor. De Jong[2] has recently investigated this same effect in solutions of soluble starch. The data in Table II indicates that the electro-viscous effect largely disappears with the first addition of the neutral salt.

[1] *Zeit. phys. Chemie*, p. 250 (1922).
[2] *Rec. trav. chim.*, *43*, 190-202 (1924).

REFERENCES TO AGAR.

Anonymous: "The Japanese Agar Industry" (*Farben-Ztg.*, *26*, 1849; 1921).

Bauder: "Agar to Be Manufactured in Southern California" (*Cal. Fish Game*, *6*, 31; 1920).

Fellers: "The Analysis, Purification and Properties of Agar" (*J. I. E. C.*, *8*, 1128; 1916).

Field: "Sources, Preparations and Properties of Algal Gelatins" (*Chem. Age*, N. Y., *29*, 485; 1921).

Gloess: "The Industrial Exploitation of Marine Plants" (*Mon. Sci.*, *83*, 97, 169, 217; 1916).

Lewites: "Action of Acids, Bases and Salts on Agar Gels." (*Zeit. Chem. Ind. Kolloide*, *2*, 161, 208, 237).

Matsui: "Japanese Seaweeds Used in the Manufacturing of Agar" (*J. Coll. Agr. Imp. Univ. Tokyo*, *5*, 413; 1916).

Merck: "Purification of Agar" (German Patent, *272*, 145; 1913).

Reed: "Composition of Edible Algae" (*Ann. Rept. Hawaii Agr. Exp. Station*, 1906, 61-88).

Samec and Isajevic: "Composition of Agar" (*Compt. rend.*, *173*, 1474; *Kolloidchem. Beihefte*, *16*, 285; 1922).

TABLET COATING.

By Edward S. Rose, Iowa City, Iowa.

Very few papers have been published on the coating of tablets and pills, commonly called "sugar coating." By those engaged in this kind of work undoubtedly much of real value is kept as secret information, which they have gained through years of experience or was taught them by others. There are those who contend this subject cannot be described or explained satisfactorily in writing but must be demonstrated at the coating pan. The writer believes this is but partly true, for certainly much helpful and practical information may be gained from the published papers. The writer has prepared this paper with the thought that it may suggest to others the giving of their ideas of and experiences in this kind of work.

The published articles on this subject deal somewhat with the history of sugar coating and give formulas, working details, and helpful suggestions; their original references are:

Sugar Coated Pills (Weigand, AM. J. PHARM., v. 74, 1902, pp. 33, 34).

Sugar Coating of Tablets (Grosh, *Merck's Report,* N. Y. July, 1911, pp. 181, 182).

The Coating of Compressed Tablets (White, *J. A. Ph. A.,* v. 11, 1922, p. 345-350).

Tablet and Pill Coating (Stokes, a book pub. by F. J. Stokes Co., Phila.).

In the following discussion of tablet coating the writer has in mind a procedure called by some the "cold process," which is adaptable to the coating of most tablets made today. It is assumed that the coating equipment consists of coating pans, a polishing pan, and a blower to force air of at least room temperature into the pans. The coating room should be warm and dry. As occasions arise reference will be made to the published articles mentioned above.

The process of coating is divided into four parts, namely, subcoat, smoothing-coat, color-coat, and polishing. Under each heading a discussion is followed by a working procedure suggested by the writer in which the following formulas are used:

Special Syrup.

Acacia	1 lb.
Corn syrup	1 lb.
Syrup U. S. P.	1 gall.

Mix. Heat to dissolve and strain.

White Dusting Powder.

Precipitated chalk	16 lb.
Powdered starch	2 lb.
Powdered sugar	2 lb.

Mix. Sift.

Heavy White Syrup.

Powdered sugar	6 lb.
Syrup U. S. P.	1 gall.

Mix cold.

Color Syrup.

Syrup U. S. P. with,
Coal tar colors, 5-12 grains to the ounce.

Mix. Bring to a boil.

Chocolate Dusting Powder.

Cocoa	1-1½ lb.
Ferric Oxide Brown (arsenic free)	2 lb.
White dusting powder	4 lb.

Mix. Sift.

Heavy Chocolate Syrup.

Chocolate dusting powder	4 lb.
Syrup U. S. P.	1 gall.

Mix.

Chocolate paste (buy from a color-house).

Sub-coat: Some tablets require a special preliminary treatment. Grosh says for tablets containing asafœtida, sumbul and like drugs, to add mucilage of acacia and sprinkle on magnesium carbonate. He recommends for potassium iodide and mixed treatment a light application of balsam of tolu and sandarac dissolved in alcohol. White states that collodion and balsam of tolu are used by some on tablets containing ferrous iodide and phosphorus; and further, that tablets to

be disintegrated in the intestines should be treated with salol dissolved in alcohol, and that tablets which attract moisture should be dried well and given 2-3 coats of a 50 p. c. solution of acacia. Stokes says that materials, which have an affinity for water, as, sodium salicylate, mixed treatment, iodides, bromides, etc., require a preliminary treatment such as an application of a small amount of raw linseed oil, or better, the use of powdered acacia or calcined magnesia as the first dusting powder. Some workers use a solution of shellac in alcohol as a general preliminary treatment. As a usual thing the writer applies a light dusting of powdered acacia at the beginning which may serve as a preliminary treatment and also help bind the subsequent coating to the tablet.

The sub-coating process consists of alternate additions of some special syrup and a dusting powder. Gelatin and sugar or gelatin, sugar and acacia in water have been suggested as special syrups. Precipitated chalk has been suggested as a dusting powder or a combination of it with one or more of the following, powdered sugar, starch (corn or potato) talc, and powdered acacia.

Working Procedure: Run the tablets in the coating pan a few minutes to remove rough edges, sift out the dust and small particles, and then return the tablets to the pan and apply any special treatment that is thought best. Add enough of special syrup to cover all of the tablets and run until they become sticky, then apply a light dusting of powdered acacia and run with plenty of air until dry. Now alternate with additions of special syrup and white dusting powder. At all times allow the tablets to become sticky before adding the powder, which should be used in sufficient amounts to completely cover the tablets or until a slight dust appears, then run with plenty of air until dry. This procedure is repeated until the tablets are completely covered. If at any time too much dusting powder has been added it will appear at the back of the pan and should be removed before the next application. It is advisable at this time to remove the tablets from the pan and screen them. Wash out the pan and return the tablets for the next step in the coating.

Smoothing-coat: This part of the coating process, as the heading implies, is to smooth up the tablets and is a long or short procedure according to the roughness of the sub-coat. In order to save

time a heavy syrup is used. White recommends a mixture of powdered sugar, chalk, and potato starch in plain syrup.

Working Procedure: Add heavy white syrup in quantities to completely cover the tablets and run with a moderate amount of air so as to allow each addition to dry somewhat slowly but completely, thus giving the sugar an opportunity to work into the low spots. After several additions of this heavy white syrup, add a few portions of syrup U. S. P. The tablets now should be smooth and white and can be polished. If they are to be colored they are given the next treatment.

Color-coat: Where coal tar colors are used it is advisable, if possible, to use certified pure food colors (U. S. Food and Drugs Act, 1906, F. I. D. 76, 164), however, any color is permissible if free of deleterious substances, as heavy metals, especially arsenic. The colors are dissolved in syrup and applied in different strengths. Grosh says 15-20 applications are necessary. The colors are matched by the eye. Grosh and Stokes suggest breathing on a few tablets from time to time in order to arrive at the desired shade. One or two tablets are sufficient to compare in this way and should then be discarded.

Working Procedure: Add a hot mixture of color-syrup and syrup U. S. P., beginning with a proportion of about 1 part color-syrup and 5 parts syrup, then gradually increasing the amount of color-syrup until it is full strength or the desired shade is obtained. Use enough mixture at each application to completely cover the tablets and yet not cause a massing together. Use plenty of air. After the last application when the tablets just begin to appear dull, stop the air and pan and cover the opening with a sheet of paper or a cloth, and then turn the pan occasionally by hand until the tablets are dry. Allow to stand several hours or overnight and then polish.

Chocolate coating, which is in fact a color coating, is discussed at this point. Chocolate or rather cocoa, which is the substance used, is not a good coating material, however a cocoa that is fat-free is less objectionable. Not all chocolate-brown coated tablets on the market contain chocolate or cocoa: where it is used it is present in small amounts. As a covering material cocoa is inferior to ferric oxide. This latter material in one form or another is really the

principal coloring substance that gives the "chocolate-coated" tablet of today. In the dusting powder White uses powdered chocolate fat-free and powdered extract of licorice; Stokes suggests the use of powdered cocoa or powdered extract of chocolate; Grosh recommends powdered cocoa. White next adds a heavy syrup containing powdered cocoa. Stokes and White finish with a syrup containing chocolate paste, which is undoubtedly ferric oxide for the most part, that has been ground to a fine state of division. Grosh uses a finishing syrup containing one of the various chocolate colors found on the market, probably a coal-tar one. He further states that a final application of a pink syrup improves the appearance of the coating.

Working procedure for chocolate coating: Sub-coat in the usual way until a fairly smooth surface is obtained, moisten with special syrup, run until sticky, then add enough chocolate dusting powder to cover the tablets, and run until dry. Repeat the operation. The tablets now ought to be completely colored and can be smoothed up. First add a few applications of heavy chocolate syrup and then use a color syrup containing a coal-tar color with the addition of small portions of a commercial chocolate paste in such amounts as will give the desired shade of color. Heavy chocolate syrup or ferric oxide brown may be used to replace the commercial chocolate paste; however, the latter usually gives a smoother surface to the tablet. When the tablets are smooth and after the last application follow the procedure described under color-coat.

Polishing: Grosh and White say to run the tablets in the polishing pan with lumps of wax, using carnauba, white wax, white ceresine, paraffin, or combinations of these. Stokes recommends the application of a solution of carnauba in acetone, and when the acetone has evaporated to shake on a very small amount of talcum. The writer suggests a solution of carnauba with a small amount of white wax dissolved in chloroform, using about 100 grains of the combination for 50,000 five-grain tablets.

Working Procedure: Place the tablets in the polishing pan and add the chloroformic solution of waxes in 2-3 portions. Run until sufficiently polished.

A Well-Coated Tablet: White points out three purposes for coating tablets: first, as a protection, second, to cover up unpleasant taste; and third, the appearance. The coating materials enumerated in this paper if used as discussed and directed ought certainly give ample protection and cover up unpleasant taste; however, a good appearance depends considerably upon the skill of the operator.

The coating should disintegrate readily and not be unduly thick. The coating of well-made tablets on the market is about 0.5 mm. in thickness, practically the same on the sides and edges. Uneven thickness in the coating is due usually to faulty sub-coating, as: adding the dusting powder before the wetting syrup has become sticky; using too little and at times too much dusting powder; or too little or too much wetting syrup. Failure to screen the tablets after the sub-coat and wash out the pan may be the cause of small particles clinging to the tablets. An uneven surface is usually caused by not carrying the smoothing coat far enough. A spotted coating is generally caused by moisture working out. Each application of any liquid or liquid and powder should be allowed to dry thoroughly before adding the next.

The proper use of the air from the blower will help produce a well coated tablet. If there is a tendency to mass together after the addition of syrup, stirring with a scoop and a full force of air for a few minutes usually starts the tablets to rolling. White points out that this massing tendency causes one tablet to pick the surface of another, thus causing an uneven coating. After the dusting powder is sprinkled on in the sub-coat stage, plenty of air will insure the edges being covered. As already stated the use of a moderate amount of air during the smoothing coat is advantageous since the sugar will remain plastic for a longer period. Plenty of air during the color-coat may help to cover the edges. Good results in polishing help make better looking tablets.

Time is an important factor in all manufacturing processes: in tablet coating it ought to be a secondary consideration, for too rapid coating usually means poor results. Stokes says some coaters turn out an ordinary run of tablets in five hours, while others require a day or more. White says 8-12 hours according to the kind of coating. The time required for coating depends not only on the kind of coating but also on the skill of the operator, so the writer believes it is better to use enough time to insure a well coated tablet than later on to try and remedy an imperfect coating.

THE HISTORY OF CHEMICAL SYMBOLS.

Henry Leffmann.

No accessory development of chemistry—by which I mean developments outside of the laboratory—has been of more advantage for the progress of the science than the introduction of the Berzelian system of symbols. This dates a little more than a hundred years ago. It is remarkable that so little information is furnished in the histories of chemistry concerning the suggestions of Berzelius. The great classic of chemistry, Kopp's *Geschichte der Chemie,* devotes several pages to the earlier suggestions for symbols, but dismisses the Berzelian briefly, remarking that the system is so well known that it needs no extended allusion.

Suggestions for symbols for some substances, especially metals were made at a remote period. Of course, the picture writing of the Egyptians involved such methods, and Egyptian inscriptions show hieroglyphics for gold, silver, copper, iron and lead, and also for a native alloy of gold and silver, called in Latin "electrum" and long regarded as a distinct metal. It is worth noting that the name for gold in Egyptian is "nub," and is the word from which Nubia is derived, that being the land from which the metal was principally obtained. In Egypt in early time, silver was rather scarcer than gold and was, therefore, more in favor. It appears also that in most ancient nations, silver was the standard in monetary matters, presumably because of the peculiar nature and general scarcity of gold. When Abraham settled with Ephron, the Hittite, for the cemetery for Sarah's interment, he weighed out, we are told, "400 shekels of silver, current money of the merchant," and when, on one occasion, Demosthenes failed to appear to deliver one of his orations against Philip, the excuse was that he had a quinzy. The Greek narrator says that some in the waiting crowd called it a "silver quinzy," that is, suggesting bribery.

In the extensive collation of literature written by or relating to the Greek alchemists of the early centuries of the present era, edited by Marcillon Berthelot, many symbols are given, among which may be noted a circle with a dot in the center or with rude representation of rays, for gold; a crescent for silver, and a combination of the two signs to show an alloy of these metals. Such signs were doubtless largely employed to conceal the meaning of the texts from all but

the adepts. It must be noted, however, and this is also true of most subsequent suggestions, that these signs meant only the things, and in indefinite mass. No idea of quantitative relations was involved. The sign, therefore, was little more than the synonym of the name. By the eighteenth century chemists had in great measure emancipated themselves from the mysticism and astrolgism of the ancients, and suggestions for symbols of a more specific type were made. Many of these suggestions, however, had the same defect as the earlier forms, namely, they represented merely the idea of the element or compound and not a specific quantity thereof.

In the first decade of the nineteenth century, when George III was king, and Thomas Jefferson President of the new Republic, John Dalton revised and developed the atomic theory, which dates from very early Greek times, and had lain practically dormant in science for over twenty centuries. As is well known, the conception of the atom was an indestructible, unalterable, indivisible mass. Each element was supposed to be distinct and transmutation was regarded as impossible. At the present time all these conceptions of atomic structure and elementary independence have been abandoned, but for nearly a century Dalton's views prevailed. He devised a set of symbols, mostly circles, variously modified. The system did not come into general use. It would be very unsatisfactory at the present time, when the list of elements is so large, which would require many modifications of the basic symbol—the circle. Kopp suggested that the use of the circle was determined by the idea that the atoms are spherical. This is quite probable, and the assumption quite natural, but without any basis in either inductive or deductive science. In the present theories of the nature of the atom, the conception of it as spherical cannot be maintained.

In 1813, Berzelius communicated a paper to Thomson's *Annals of Philosophy* (1813, *2*, 443, *et. seq.*), a paper which ran through several numbers on the subject of combining proportions of the elements, and at the close of this suggested a system of symbols based on abbreviations of the names of the elements. He entitled this part of his essay "A short and easy method of expressing them" (that is, chemical proportions). There is no direct indication that the paper is a translation or reprint from a Continental source, but in one of the later issues of the *Annals,* a short note from Berzelius is printed in which he states that one sentence was mistranslated. He gives the original sentence in German, which indicates that he wrote the

paper in that language, or at least sent it to the editor of the *Annals* in that form. German was probably used because the Scandinavian languages are not so extensively understood, in fact even at the present, Scandinavian chemists often use German in their publications.

Berzelius added to his essay descriptions of many of the elements, and gave symbols for them. Most of these are the same as now used, but there are a few notable differences. At that time the exact nature of the halogen acids and salts was misunderstood, and Berzelius gives M as a symbol for the muriatic "radicle" and F for the fluoric. Mercury is printed in one place as Hy, but this may be a typographical error. Tungsten is represented by W in one place, in another as Tn. The most striking differences are the use of Po and So for potassium and sodium. This must have been the influence of the English environment, for Kopp states that Berzelius was in England in 1813.

The system found no general acceptance for many years. Dalton, in papers communicated by him to the *Annals,* used his own symbols, and the issues of the *Annals* for several years after the publication of Berzelius suggestions do not contain any reference to them, using only names according to the system of nomenclature devised by Lavoisier and his associates. Thomson issued a four volume edition of a descriptive chemistry in 1817, which was republished in Philadelphia in 1818, but the symbols were not used.

It seems almost beyond belief today, when these symbols are in such extended and unquestioned use, that objection should be made to them, but in his "Lehrbuch der Chemie," translated from the Swedish by Wöhler (3d vol., 1st part, p. 111, Dresden, 1827), Berzelius states that the system has been condemned as obscure, misleading and useless. To these objections the author replies fully. Objection was also made to the confusion which would arise between the chemical significance of the letters and their mathematical significance, and, incidentally, it was said that mathematics had the prior right to such use. This objection had somewhat more force in the original method of writing the exponent (as a superior) thus conflicting with the use of it as a sign of power, but such overlapping was early eliminated by using the exponents as inferiors, a practice now followed all over the world except by the French chemists. We are not astonished to learn that a French chemist (Beudant) in what Berzelius calls "National Eitelkeit" (vanity or as we would term it today "chauvinism"), transliterated the system by using the initials

of the French words for the elements, as is, indeed, still found occasionally in French chemistries. Berzelius, justly, deals severely with such a tendency, and quotes Sir Humphrey Davy's celebrated remark: "Science, like that of Nature, to which it belongs, is neither limited by time or space, it belongs to the world and is of no country and of no age."

In the issue of the "Lehrbuch," from which these data are taken a list of symbols is given in which each item accords with what is now in general use. K and Na are given for potassium and sodium respectively. Fifty-one elements are in the list.

The Berzelian symbols had four great advantages over every other system suggested.

They are practically self-suggestive. As soon as a newly discovered element is named, the formation of its symbol is automatic.

They involve no additions to the outfit of the printing office, being all composed of the standard letters of the leading languages.

They represent a definite amount of each element in comparison with a standard and thus give a quantitative character to all formulas.

They constitute in their present development an international language of excellent applicability.

CONCERNING SOLUTION OF MAGNESIUM CITRATE.*

Wilbur L. Scoville, Ph. M.

The September issue of the AMERICAN JOURNAL OF PHARMACY contains an interesting article by Joseph W. England in which he compares the palatability of the French Codex "Purgative Lemonade of Magnesium Citrate" to our U. S. P. preparation, and to the detriment of the latter. His particular point is that the U. S. P. preparation is too acid, as compared with the French, and the excessive acidity renders it unpalatable.

In comparing the formulas, Mr. England points out that the U. S. P. preparation has been steadily increased in acidity in order to augment its stability. The U. S. P. formula uses 15 Gm. of magnesium carbonate and 33 Gm. of citric acid per bottle. In order to form the soluble acid-citrate of magnesium, 15 Gm. of the U. S.

*A Bulletin submitted by the Author to the Committee of Revision of the United States Pharmacopœia.

P. carbonate requires 32.43 Gm. of citric acid, and 33 Gm. is directed. But in order to secure effervescence, the U. S. P. directs the addition of 2.5 Gm. of potassium bicarbonate which will neutralize 1.75 Gm. of citric acid, leaving 31.25 Gm. to remain in combination with the magnesium. This does not allow of quite enough citric acid to transform and hold the magnesium salt entirely into the acid citrate —$MgHC_6H_5O_7$—and it is probably the neutral salt, $Mg_3(C_6H_5O_7)_2$, which separates out on standing and causes the pharmacist much annoyance and loss. To correct this the present Revision Committee has increased the acid (again) to 35 Gm., which will permit of the transforming of the magnesium carbonate entirely into the acid citrate and still allow a small excess (0.82 Gm.) of citric acid after the potassium bicarbonate has been added. Experiments have proved that thus increasing the acid prevents the precipitation, now so troublesome, at least for some time.

In so far as pharmaceutical stability and appearance goes, this increase in acidity is necessary, but as for the taste, Mr. England is right in objecting to it. The sub-committee took the position that an agreable taste should be secondary to the stability and activity of the preparation.

Now Mr. England states that personal friends of his purchased in Paris at an equivalent of fourteen cents per bottle the French Codex preparation, and "were most enthusiastic about its delicious 'lemonady' taste and efficient action," claiming that it was markedly superior to the "Citrate of Magnesia" sold in the United States. Such a statement is worthy of attention.

On comparing the French formula, we find that in a bottle of approximately twelve fluid ounces, there is required 20 Gm. of magnesium carbonate, 32 Gm. of citric acid and 75 cc. of syrup. The 20 Gm. of magnesium carbonate will require 46 Gm. of citric acid to produce the acid citrate, so the preparation is obviously less strongly acid. It is also sweeter than the U. S. P. preparation—75 cc. of syrup as against 60 cc.—and contains more of the lemon flavor.

But—and here is a significant point which should be well noted —the French Codex authorizes three different strengths of "Purgative Lemonade of Citrate of Magnesium" under one title. The above formula is credited with containing 50 Gm. of magnesium citrate; but one can dispense a lemonade to contain 40 Gm. of magnesium citrate by using 16 Gm. of magnesium carbonate and 25.6 Gm. of citric acid, or one of 30 Gm. of magnesium citrate by using 12 Gm. of magnesium carbonate and 19.2 Gm. of citric acid.

Furthermore, it permits of replacing 2 Gm. of magnesium carbonate with 4 Gm. of sodium bicarbonate, to insure a clear solution and satisfactory effervescence, and it also permits a change in sweetness and the use of either syrup of cherries or syrup of currants in unspecified amounts.

In other words, in purchasing the French "Lemonade of Magnesium Citrate," one may get a strength of 50, 40 or 30 Gm. of magnesium citrate per bottle—or less, and a flavor of lemon, cherry or currant with a somewhat varying sweetness and acidity; and all is official. Now what did Mr. England's friends get that pleased them so much? If palatability were the main factor, one might expect the weakest preparation to be dispensed. That would be two-thirds as strong in magnesium citrate as the U. S. P. solution.

One thing is plain—all of the French preparations are less strongly acid than the U. S. P. solution. In each case only about two-thirds as much acid in proportion to the magnesium carbonate is used as in the U. S. P. preparation. The use of syrup of cherries or syrup of currants will increase the acidity but slightly.

But Mr. England's friends were satisfied with the activity of the French preparation as well as with its flavor. Now the question arises—is the U. S. P. Liquor Magnesii Citratis stronger than it needs to be?

In considering this, an experience of our sub-committee, when this preparation was being discussed, is of interest. Messrs. L. A. Seltzer and W. A. Hall, of Detroit, offered the following formula for consideration:

Magnesium Carbonate,	8.33 Gm.
Citric Acid,	20.00 Gm.
Sugar,	56.66 Gm.
Oil of Lemon,	0.20 cc.
Purified Talc,	2.50 Gm.
Potassium Bicarbonate,	2.00 Gm.
Water, a sufficient quantity to make	350.00 cc.

Mr. Hall says of this formula: "Having made this preparation for over thirty years based on that process, with only slight modification, I cannot speak too highly of the product, whether judged from the pleasant taste, ease of manufacture, keeping qualities or therapeutic effects."

Mr. Seltzer, on a shorter experience with it, corroborates Mr.

Hall's judgment. Both insist that after a considerable sale of this preparation it is preferred by both physicians and patients, to the U. S. P. preparation, but it will be noted that it is only a little more than half as strong in magnesium citrate as the U. S. P. preparation. It is sweeter and also relatively more acid. In fact, Mr. Hall stresses the desirability of keeping it acid. As to keeping qualities, I have made several samples and kept them for varying lengths of time, and have not seen any precipitation or mould formation in any bottle. One sample made in August, 1922, is still on hand, is clear and suitable for dispensing. This is now more than two years old.

This formula was freely discussed in the committee, and was favored for adoption by a vote of three to two, but on further consideration it was rejected, mainly on the ground that cutting the strength of the solution in half was equivalent to reducing the dose of that salt and that is beyond the function of this sub-committee. Now the paper of Mr. England's again raises the question whether a reduction in strength of this preparation would not supply a more satisfactory remedy in all respects? We do know that half a bottle of the U. S. P. preparation is frequently given for a dose by physicians.

It may be wise to introduce into the Pharmacopœia a Liquor Magnesii Citratis Mitis—a mild solution—having half or two-thirds the strength of the present solution. An experience during the ten-year period of the Pharmacopœia would prove whether such a strength is desirable or not. This, if done, should first be approved by the Sub-committee on Scope or on Therapeutics. Doubtless a more palatable preparation can be secured in reducing the salt strength. Furthermore, there is some evidence that indicates that a weaker solution can be made less acid and yet not precipitate on standing.

Data on the solubility of either the neutral or acid citrates of magnesium are lacking, but a long experience with the U. S. P. preparation points to its being too near to the saturation point to be pharmaceutically satisfactory. A reduction in strength would probably mean a more stable solution, and it might allow of such adjustment in acidity and flavor as will make it much more palatable.

Mr. England is right about the present preparation being too acid to be palatable but a solution of this strength must be strongly acid to be stable. If a weaker solution be introduced it can be made much more palatable. Should it be done?

"PHARMACY—AS WAS AND IS."

A PLAY

Presented in Two Acts and Two Scenes.

Written by Robert J. Ruth, P. D.

As Presented by the Students of The Philadelphia College of Pharmacy and Science, on Founders' Day, February 23, 1924, in Observance of the One Hundred and Third Anniversary of the Founding of the College.

ACT I.

SCENE: Interior of Apothecary Shop of George Glentworth, located at Northeast corner of Sassafras (now Race) and Chester Streets (between Eighth and Ninth Streets).

TIME: February 23, 1821, during business hours. (Note: The Glentworth Store is authentic, it having been established in the above location in 1812 and was conducted for over ninety-two years. The original fixtures and much of the equipment are used in this scene, they belonging to the vast collection of interesting subjects to be found in the College Museum.)

CAST OF CHARACTERS.

George Glentworth	Proprietor
Silas Pennypacker	Head Clerk—a Quaker
Peter Fothergill	Apprentice
Stephen Wetherill	Apprentice
Daniel Scattergood	Apprentice
Joseph Turnpenny	Apprentice
Jonathan Rittenhouse	Customer
Mrs. Isaac Goodyear	Customer
Mrs. Jacob Shinn	Customer
Richard Biddle	Customer
Mrs. John Ellis	Customer
Benjamin Thacher	Customer—a Quaker
William Morris	Customer—a Quaker
Charles Webster	Customer
John Williamson	Customer
Joseph Caldwell	Customer
Mrs. Anthony Bringhurst	Customer
Anne Shoemaker	Customer
Dirck Streypers	An up-State Quaker
Dr. James Logan	Customer
Alexander Deshler	Customer

Scene opens with all hands busy.
Silas Pennypacker, head clerk, is filling a prescription.
Peter Fothergill, an apprentice, is making a plaster.
Stephen Wetherill, an apprentice, is making pills.
Daniel Scattergood, an apprentice, is pounding Blood Root in an iron mortar (*sneezes repeatedly*).
Joseph Turnpenny (youngest apprentice), is washing bottles and jars.
Silas Pennypacker sneezes thrice.

SILAS PENNYPACKER: "Thou makest much dust to fly, Daniel, try to confine the Blood Root Powder to thy mortar." (*Sneezes again. Ceases his work and picks up paper.*)

"Before he returns I would ask thy attention whilst I read the list of Rules and Regulations of this establishment as compiled by thy worthy employer."

1. Store to be opened promptly at 7 A. M. and closed at 10 P. M.; Saturdays, 10.30 P. M.; Sundays, 9 A. M. to 9 P. M.
2. Business hours will include time between 7 A. M. and 6 P. M. on week-days, except when special work requires longer hours.
3. During business hours all hands must be on their feet and employed either in waiting on customers or some other store duty.
4. As waiting on the counter requires most knowledge and experience, the senior clerk must always go front first, then the next oldest. The younger clerks are not to wait on customers except when the older clerks are occupied.
5. In every case customers must be waited on promptly and when goods are to be sent, it must be done with the least possible delay.
6. Never put up an article unless you are certain you are right.
7. Every other duty must give way to waiting on the counter, except where serious detriment would be the consequence.
8. Every person entering the store, whether rich or poor, infant or adult, white or colored, must be treated with courtesy and kindness.
9. Boisterous mirth and a sullen temper are to be equally avoided as productive of neither business nor business character.
10. There are to be no master and no servants. Each one is to feel conscious of the fact that the performance of the

duties assigned to him are just as necessary and as important as what pertains to any other hand in the store. All useful employment is honorable. Indolence is a disgrace.

11. As neatness, order, cleanliness and accuracy are necessary and not mere accomplishments in a pharmacist, all are required to practice them constantly.
12. Students need but few social acquaintances and they should be very select. While the occasional visit of a well-behaved young friend will be allowed, lounging in the store will not be tolerated.
13. Each junior clerk will have at his disposal an afternoon and evening every week (from 1 P. M. until 10.30 P. M.), and these privileges will not be interfered with unnecessarily. Rooms are furnished for all clerks in store building.
14. No junior clerk will be allowed to be absent at night after hours without permission. The first and second clerks are expected to be in at reasonable hours, and under no circumstance are both to be away at same time.
15. Each clerk will be allowed two weeks vacation each year.
16. Necessity requires that the store should be accessible on Sunday for the purpose of supplying medicines; beyond this the proprietor is not desirous of doing business on that day, and he enjoining on those in his employ that while they need not positively decline to furnish an article when asked for, to hold out no inducements to purchasers.
17. It is not the wish of the proprietor that any of his clerks should extol an article beyond its merits to advance his pecuniary interests, or to say or do aught in the performance of his duty that he would not be willing that others should say or do to him under the same circumstances.
18. Goods taken from stock for personal use of clerks must be paid for at cost.
19. The proprietor would affectionately recommend and advise all his clerks to attend public worship with a denomination of his own selection, at least once every Sunday, as circumstances may permit. The habit when accompanied by a corresponding moral deportment (without considering the immense spiritual advantage which may result from it),

confers a degree of respect in the estimation of those whose esteem is worth having, that scarcely any other act will.

20. The daily intercourse of the employees should be characterized with the courtesy becoming young gentlemen.

21. Should a clerk wishing to leave before his allotted time expires have a good reason, the proprietor will not probably object, and should his cause be a bad one and be persisted in, the proprietor will certainly not offer hindrance to his going. The proprietor depends on the honor of the individual.

22. A cheerful compliance with the foregoing rules is expected and the repeated infraction of a known regulation will be cause for immediate dismissal.

"May you gentlemen conduct yourselves accordingly. It is essential that care of your conduct be in strict observance, as Dr. Glentworth is now attending a meeting of the apothecaries of the city and Liberties of Philadelphia, being held in Carpenter's Hall, where the establishing of a College of Apothecaries is under consideration, and his wish is that each of you deserving of the knowledge and practice of the profession, may attend the college, if it be established."

JOSEPH TURNPENNY: "Why do they wish to establish a college, Mr. Pennypacker?"

SILAS PENNYPACKER: "They feel that the apothecaries themselves are best fitted to pass upon the qualifications of those worthy of practising the profession, and as the university has established a course of lectures on Pharmacy, leading to the Degree of Master of Pharmacy, and this course is not under the supervision of Apothecaries, they feel that they must act without delay in the matter.

"Then also, there is dire need of a standardization of our medicines. Only recently a case of Persian opium purchased in New York and brought here was found to be spurious and the whole shipment withdrawn from sale. Many medicines are prepared differently at different stores because we have no standard methods of procedure or standard formulæ."

(*Jonathan Rittenhouse enters.*)

PENNYPACKER: "Good afternoon, Friend Rittenhouse."

RITTENHOUSE: "Good afternoon, Friend Pennypacker. Have you Coxe's Hive Syrup?"

PENNYPACKER: "Indeed, Jonathan, and how much wouldst thou wish?"

RITTENHOUSE: "About a quarter pint, I would say."

(*Pennypacker puts it up, conversation continuing in meanwhile.*)

RITTENHOUSE: "Is there as much distemper as usual for this season?"

PENNYPACKER: "I would say more, but scarcely no cholera at present, Friend Rittenhouse."

RITTENHOUSE: "And one of those baby's nipples. How do you make them?"

PENNYPACKER: "They are heifer's teats trimmed and preserved in alcohol."

RITTENHOUSE: "Very ingenious I should say, and quite admirable for the purpose."

PENNYPACKER: "Yes, we sell a great many."

RITTENHOUSE: "What next, what next? It would appear that there is nothing new under the sun. How much, Friend Pennypacker?"

PENNYPACKER: "Thirty-five cents, please. Thank thee, farewell, Friend Rittenhouse."

RITTENHOUSE: "Good day, Friend Pennypacker."

(*As Rittenhouse leaves, Mrs. Isaac Goodyear enters.*)

PENNYPACKER: "Good afternoon, Friend Goodyear, and how may I serve thee?"

MRS. GOODYEAR: "Do you carry the common or genuine British Oil?"

PENNYPACKER: "Only the genuine, Friend Goodyear."

MRS. GOODYEAR: "That is good—I can find no merit in the common British Oil; you may send anytime between now and nightfall, a bottle of the genuine British Oil; a bottle of Church's Cough Drops, as Elizabeth does have the distemper so badly; and include some boneset, they say it is so good for consumption, I'll try it for Elizabeth's distemper. Where is Dr. Glentworth this afternoon, Mr. Pennypacker?"

PENNYPACKER: "He is attending a meeting of apothecaries, being held in Carpenter's Hall, Friend Goodyear."

MRS. GOODYEAR: "Ah, the mysteries and art of your profession! How very fascinating it must be!"

PENNYPACKER: "Quite so, quite so, Friend Goodyear. Thank thee for thy order, Friend Goodyear."

MRS. GOODYEAR: "You are quite welcome—good day, sir."

PENNYPACKER: "Farewell, Friend Goodyear. Call again, please."

(*At the door—Mrs. Goodyear meets Mrs. Jacob Shinn.*)

MRS. SHINN: "Good afternoon. Is someone ill at your home, Mrs. Goodyear?"

MRS. GOODYEAR: "Yes, Elizabeth is so troubled with distemper."

MRS. SHINN: "That is too bad. Jacob is troubled so much, too, and he has such a time with his gout. I'm now after some opodeldoc. (*Turning to Pennypacker.*)

"Will you put up a pint of opodeldoc, and some of those gout and rheumatic drops, Mr. Pennypacker? I'll be back in about an hour. I think I'll walk back with you, Mrs. Goodyear, and see poor little Elizabeth."

MRS. GOODYEAR: "Do! She will be so delighted."

(*Exit—both ladies.*) (*Both talking at once.*)

(*Pennypacker turns to Joseph Turnpenny.*)

PENNYPACKER: "Joseph, there are many errands for thee to run. First, take this broken Carbonate of Magnesia, that I have packed in these earthen jars, over to Abram Miller's Pottery to be burned. Then go to Farr and Kunzie's and get 10 lbs. of Muriate of Ammonia; stop at Geo. D. Wetherill and Co. for a jug of Castor Oil and ask them to send us a barrel of Glauber's Salt."

JOSEPH TURNPENNY: "Yes, Friend Pennypacker."

(*Picks up jars. Exit Turnpenny.*)

(*Enter Richard Biddle.*)

PENNYPACKER: "How dost thou do? Friend Biddle."

BIDDLE: "Good afternoon. Have you my package ready?"

PENNYPACKER: "Yes, Friend Biddle, thy calomel, ipecac and jalap powder and the Ointment of Sour Dock Root for thy tetter."

BIDDLE: "Correct, Mr. Pennypacker. How much, sir?"

PENNYPACKER: "One dollar, please."

BIDDLE (Pays same): "Good day, Friend Pennypacker."

PENNYPACKER: "Thank thee. Farewell, Friend Biddle, and call again, please."

MR. BIDDLE: "I hope I won't find it necessary."

(*Exit Mr. Biddle.*)

(*Enter Mrs. John Ellis.*)

MR. PENNYPACKER: "How art thou, Friend Ellis?"

MRS. ELLIS: "Good afternoon, Mr. Pennypacker. I want to get some yarbs."

MR. PENNYPACKER: "Very good, Friend Ellis—what kind does thee wish?"

MRS. ELLIS: "Two ounces each of Jimpson Weed and cat mint. John smokes the Jimpson Weed in a pipe for asthma."

PENNYPACKER: "Very good, Friend Ellis." (Puts it up.)

(*Enter Benj. Thacher and William Morris.*)

(*Peter Fothergill—head apprentice, waits on them.*)

MR. PENNYPACKER: "How are you, Friends Benjamin and William. I trust you are both of sound health."

MR. THACHER: "Not so well, Silas. I trust thy apprentice may make no mistake. I wish a small pot of snake grease."

MR. PENNYPACKER: "I will supervise him, Benjamin." (Turns to Peter).

"Peter, get the pot marked 'Adeps Viperæ' and bring it to me. (Peter does.) "That's right. Now thou mayst fill this pot for Benjamin."

(Turns to Stephen Wetherill, next apprentice in line): "Stephen, see what William wishes."

MORRIS: "No, I am quite sound, Silas, and in no need of thy valued services. I am in company with Benjamin."

(*Pennypacker gives Mrs. Ellis her package.*)

PENNYPACKER: "Thirty cents, please, Friend Ellis."

(*Mrs. Ellis pays.*)

PENNYPACKER: "Thank thee kindly—and farewell, Friend Ellis."

MRS. ELLIS: "Good day, Mr. Pennypacker."

(*Pennypacker turns to Thacher and Morris—Quakers.*)

PENNYPACKER: "William, thy remarks at the Friends' Meeting last First Day were most acceptable."

BENJAMIN THACHER: "Indeed, Silas, I have just told William the same."

WILLIAM MORRIS: "The word of God is always acceptable—no matter who repeateth it."

(*Stephen hands pot of snake grease to Pennypacker.*)

THACHER: "How much, Silas?"

PENNYPACKER: "Twenty-five cents, Benjamin."

(*Thacher pays same.*)

PENNYPACKER: "Thank thee. Farewell, Benjamin and William."

THACHER AND MORRIS (in unison): "Farewell, Silas."

(*Exit.*)

(*Enter Charles Webster.*)

PENNYPACKER: "How art thou, Friend?"

WEBSTER: "Good afternoon. I wish some of that Ointment of Pokeberry Juice for cancer, and a pound of Flowers of Sulphur and you may put them up and my coachman will call for them this evening."

PENNYPACKER: "What is thy name, Friend?"

WEBSTER: "Charles Webster—of Fourth and Chestnut Streets. How much will it be?"

PENNYPACKER: "One dollar and a quarter, please." (Webster pays.)

PENNYPACKER: "Thank thee. Farewell."

WEBSTER: "Good day."

(*Exit Webster.*)

(*Enter John Williamson and Joseph Caldwell.*)

(*Pennypacker waits on Williamson.*)

(*Peter Fothergill waits on Caldwell.*)

PENNYPACKER: "How are you, Friends?"

FOTHERGILL: "Good afternoon, gentlemen."

WILLIAMSON AND CALDWELL (in unison): "Good afternoon."

WILLIAMSON: "I would like some of your grape vine sap hair grower."

CALDWELL: "And I some Daffy's Elixir."

PENNYPACKER: "Very good, Friends."

FOTHERGILL: "Yes, sir."

(*Pennypacker and Fothergill put up the medicines.*)

(*Williamson and Caldwell converse.*)

CALDWELL: "Do you find the grape vine sap hair grower beneficial?"

WILLIAMSON: "I have used only one bottle, but my coachman knows another coachman whose employer knows a gentleman who grew a most luxurious head of hair by its application."

CALDWELL: "Is it possible? And how do you find business?"

WILLIAMSON: "Not good; in fact it is very stagnant. It seems that we are in an era of Hard Times."

CALDWELL: "Yes, it does, and no doubt the present administration is much to blame."

WILLIAMSON: "Yes, and taxes higher than ever before. I wonder when they will stop going up."

CALDWELL: "George Smythe must have been out of his senses to pay thirty-two hundred dollars for that corner on Chestnut St."

WILLIAMSON: "Yes, it will never be worth that in a hundred years."

(*Pennypacker and Fothergill return with medicines.*)

PENNYPACKER: "One dollar, Friend Williamson."

FOTHERGILL: "One dollar, Mr. Caldwell."

(*Williamson pays.*)

(*Caldwell pays.*)

CALDWELL: "Seems like everything is one dollar nowadays; a dollar does not buy much."

WILLIAMSON (laughing): "It certainly does not go as far as it used to."

PENNYPACKER: "Quite so, quite so, we find it so in our business. Farewell, Friends."

FOTHERGILL: "Thank you, good afternoon."

WILLIAMSON AND CALDWELL (in unison): "Good day."

(*Exit.*)

(*Enter Mrs. Anthony Bringhurst.*)

PENNYPACKER: "Good afternoon, Friend Bringhurst, what are thy wants?"

MRS. BRINGHURST: "A half pound of Sassafras Bark."

PENNYPACKER: "Very good, Friend Bringhurst,"

(*He gets same.*)

(*Enter Anne Shoemaker.*)

ANNE: "Oh, good afternoon, Mrs. Bringhurst."

MRS. BRINGHURST: "Good afternoon, Anne. Are you going to Cousin Rebecca's quilting party, Anne?"

ANNE: "Indeed it will be such fun."

(*Peter Fothergill comes to wait on Anne.*)

(*Business of much blushing by both.*)

PETER: "Good afternoon, Anne."

ANNE: "Good afternoon, Peter. I want some Flake White, Peter."

PETER: "First tell me if I may call for you after the quilting party."

ANNE: "First get my Flake White (chiding) and I'll think it over in the meanwhile."

(*Peter complies.*)

PENNYPACKER: "Here is thy Sassafras Bark, Friend Bringhurst. Fifty cents, please."

(*Mrs. Bringhurst pays.*)

MRS. BRINGHURST (turning to Anne): "Shall I wait for you, Anne? Are you going my way?"

ANNE (hesitating and blushing): "Why er—no—that is—I guess you had better not wait, as I shall be needing more things in the market."

(*Mrs. Bringhurst looks knowingly at the blushing Anne and Peter and pays Pennypacker.*)

PENNYPACKER: "Thank thee and farewell, Friend Bringhurst."

MRS. BRINGHURST: "Good day, Mr. Pennypacker. Good day, Anne —run in, dear."

ANNE: "I will, thank you; good day."

(*Comes Peter with Anne's package.*)

PETER: "May I, Anne—dear?"

ANNE: "I presume you may, Peter."

PETER: "Dear?"

ANNE: "Yes—dear. How much is this?"

PETER: "What did you get?"

ANNE: "Why mercy me, you put it up—I hope it is Flake White."

PETER: "To be sure. It is ten cents, Anne—dear."

(*Anne pays.*)

ANNE: "Good-bye, Peter."

PETER: "Dear?"

ANNE: "Yes, I presume—"

PETER: "Good-bye—beloved."

(*Business of much tittering among apprentices. Pennypacker looks up—catches Daniel Scattergood grinning at Peter.*)

PENNYPACKER: "Daniel—see if thee can improve thy time by going to Stephen North's Wholesale House for twenty pounds Sassafras Bark—I just sold the last to Friend Bringhurst."

(*Daniel's face assumes a sphinx-like expression as he departs.*)

(*Enters Dirck Streypers and Dr. Logan.*)

PENNYPACKER: "Good day, Friends."

(*Turning to Peter.*)

"Peter, wilt thou wait upon this Friend?"

(*Turning to Dr. Logan.*)

PENNYPACKER: "How art thou, Doctor?"

DR. LOGAN: "Good afternoon, Mr. Pennypacker, I should like about a half pint of Tincture of Iron Acetate."

PENNYPACKER: "Very good, Doctor, and art thou extremely busy this month?"

DR. LOGAN: "Very busy—with so much distemper, and the added misery of hard times, among my poorer patients."

PENNYPACKER: "It is distressful—Shall I charge this, Doctor?"

DR. LOGAN: "Yes, put it on my account."

"Good day, Mr. Pennypacker, Peter and Stephen."

(All three in unison): "Good day, Dr. Logan."

(*In the meantime, Dirck Streypers has asked the direction to the Friends' Burial Ground at 5th and Arch.*)

STREYPERS: "Couldst thou direct me to the Friends' Burial Ground?"

PETER: "Yes, sir, 4th street down and 2 streets over, 5th and Arch sts." (Motioning the directions.)

STREYPERS: "Thank thee."

PETER: "You are very welcome, sir."

(*Exit Streypers.*)

(*Enter Dr. Glentworth, Proprietor.*)

(*Aglow with enthusiasm.*)

GLENTWORTH: "Good afternoon, my faithful workers."

All three in unison: "Good afternoon, Doctor."

GLENTWORTH (Glentworth removes coat and hat): "Henry Troth and Peter Lehman did well to call this meeting. About 60 were present. Stephen North was chosen to act as Secretary. The discussion was very spirited and it was brought forth that the practice of pharmacy in our city is defective, irregular and open to abuse, and that we apothecaries are the proper ones to effect the needed remedy. The speeches were rousing and everyone present favored the founding of a college of apothecaries to be conducted and maintained by the apothecaries of the city. A committee was appointed to determine upon the plan, and on it were placed Samuel Jackson, Daniel B. Smith, Robert Milnor, Peter Williamson, Stephen North, Henry Troth, Samuel Biddle, Chas. Allen, and Frederick Brown."

(*Enters Alexander Deshler.*)

DR. GLENTWORTH: "Good afternoon, sir."

DESHLER: "Good afternoon. I would like the head of a coal black cat burnt to ashes in a new pot to be blown into the eye for a cataract."

DR. GLENTWORTH: "My dear sir, I would feel guilty of malpractice in preparing such a preparation. Not only is it without merit but may subject you to extreme dire results."

DESHLER: "I knew a man to be cured in that very manner."

GLENTWORTH: "You knew him personally?"

DESHLER: "Well, not exactly, but the bar waiter at the Blue Goose Tavern knows a sailor, who knows a man in England that was cured in that manner."

GLENTWORTH: "Rather a long way from here and I am of the opinion that it is rather a long way from authentic, my good man."

DESHLER: "I can get another apothecary in the city to prepare it."

GLENTWORTH: "That is your privilege, my good sir, but I am ashamed to admit him into the sphere of our profession."

DESHLER: "What have you to cure a cataract?"

GLENTWORTH: "I would advise you to go to your physician, and I hope you will feel that I am advising you for your own good."

DESHLER: "Thank you, sir, I will heed your advice."

(*Exit Deshler.*)

GLENTWORTH (passionately): "Thank God! That my long years of service as an apothecary have taught me that there is much more to the practice of my profession than its mere emoluments. In the final analysis, suffering humanity is the most important thing to be considered. Here is where we need the highly trained apothecary who loves not only his work, but his fellowmen, who practices his profession in the fellowship of love and service, of mutual aid and sympathy to the sick, and who gains and uses all the knowledge possible in this spirit. Thank God! for this afternoon's meeting and may it be fruitful in establishing a great institution of learning for the future generations of apothecaries, that they may be enlightened beyond all of our fondest imaginings, for the sake of suffering humanity."

(*Curtain.*)

ACT II.

SCENE: Interior of any suburban drug store within commuting distance of Philadelphia.

TIME: February 23; 1924—7.30 A. M.

CAST OF CHARACTERS.

Mr. P. L. Aster, Ph. G.	Proprietor
Mr. S. C. Pill, Ph. G.	Prescription Clerk
Jack Jones, Student, Q. A.	Relief Clerk
Harold Smith, Student, Q. A.	Relief Clerk
Christopher Columbus Ichthyol Jackson	Colored Porter
Betty Bright	Girl Clerk
Mr. Stevens	A Customer
Mr. Boynton	A Customer
Mr. Crandall	A Customer
Miss Smiley	A Customer
Mr. Cochran	A Customer
Mrs. Baron	A Customer
Mrs. Schafer	A Customer
Willie Foster (Juvenile)	A Customer
Mr. Reynolds	A Customer
Mr. Walters	A Salesman
Mr. Gray	A Customer
Sally Flapper	A Customer
Alec Smart	A Customer
Mr. Thomas	A Customer

(Scene opens on empty store—telephone ringing incessantly, pause of about 30 seconds—telephone keeps up steady ringing—rattle of key in door—door opens and proprietor walks in—overcoat and hat on, etc.)

ASTER: "Five minutes after opening time and nobody down yet—guess I'll have to be here all the time myself."

(Picks up 'phone, which keeps ringing.)

ASTER: "Hello—Yes—Aster's Pharmacy. No, Mrs. Boynton, I haven't seen Mr. Boynton go by on the way to the station. Yes, Mrs. Boynton, I'll tell him to call you up. You're welcome—good-bye."

(Slips off coat and hat and puts behind prescription case.)

(Enters Mr. Stevens.)

ASTER: "Good morning, Mr. Stevens."

STEVENS: "Good morning, Mr. Aster—Send these two prescriptions and a bottle of citrate over to the house—got to hurry—train's coming—'Bye—"

(*Aster sees Mr. Boynton passing.*)

(*Hails him at the door.*)

ASTER: "Wife wants you to call her up, Mr. Boynton."

BOYNTON: "Ain't got time, train coming—Call her up and tell her I'll 'phone her from city. Will you?"

ASTER: "All right."

(*Boynton rushes on.*)

(*Crandall sticks his head in door.*)

CRANDALL: "Doc—Will you 'phone my wife to shut off the draft on the furnace?"

ASTER: "Sure."

(*Crandall rushes off.*)

(*Enter—Ichthyol—the porter.*)

ASTER: "Why Ichthyol—Are you still working here?"

ICHTHYOL: "Deed Boos, I am—my car was late again."

(*Ichthyol gets broom—while Mr. Aster uses 'phone.*)

ASTER: "Parkside 1009 M—(long pause). Hello—Who?—No, I don't want the Brewery. I thought Butler closed all those places." (Business of Jingling hook.) "Operator, Parkside 1009-M — (long pause — repeats number — longer pause.) Finally—

ASTER: "Mrs. Boynton? Mr. Aster speaking. Mr. Boynton had to rush for his train and will call you from the city. You're entirely welcome—good-bye."

(*Enter Miss Smiley.*)

MISS SMILEY: "Oh, good morning—Mr. Aster—I'd like two hair nets, cap shape—blonde—" (Mr. Aster gets them.) (Miss Smiley keeps on rapid fire conversation.)

MISS SMILEY: "The kind I get here wear so well—I've had engagements every night for three weeks, and this one wore straight through 'till last night—but I sure got it ruined and by the way, Mr. Aster, Oh! yes, here's your quarter first—Why, Mr. Aster—wouldn't you like to buy a ticket to our Charity Ball? They are only $5.00 this year."

MR. ASTER: "Why, I guess I can help you out, Miss Smiley." (Rings up 25 cents—makes paid out slip for $5.00 and hands to Miss Smiley—who gives him ticket.)

MISS SMILEY: "Oh, thanks, awfully—Mr. Aster—you're just adorable."

(*Mr. Aster smiles and looks pleased.*)

(*Exit Miss Smiley.*)

(*Mr. Aster takes paid-out ticket.*)

MR. ASTER: "Well, I guess this comes under the head of Charity." (Marks ticket and drop it in box.) "Or flattery. Ye Gods—Crandall's furnace!" (Picks up 'phone receiver.)

MR. ASTER: "Boulevard 606—(pause.) Hello—Mrs. Crandall? Mr. Aster speaking. Mr. Crandall dropped in on his way to the train and asked that I call you and tell you to shut off the draft on the furnace. You did? Oh, no trouble, I assure you. Good-bye." (Hangs up.)

MR. ASTER: "Where in the world is all the help this morning?"

ICHYTHOL: "Must be late cars."

(*'Phone rings.*)

MR. ASTER (picks up receiver): "Aster's Pharmacy—No, Mrs. Gump, I have not seen your umbrella. Yes, I know you generally leave it, but it is not here now. That's all right. Good-bye."

(*Enter Mr. Cochran.*)

ASTER: "Good morning, Mr. Cochran. Fine morning."

COCHRAN: "Is it? Let me have a box of Seidlitz Powders—banquet last night—feel rotten."

(*'Phone rings.*)

ASTER (hands out Seidlitz Powders): "Thought Butler stopped these morning-after headaches."

COCHRAN: "Wish he could stop this one."

(Aster picks up receiver and makes change with other hand.) "Hello, yes, Mrs. Dolittle—No—Haven't seen it—" (Looks under counter, Mr. Cochran departs.) "No, it really is not here, Mrs. Dolittle. Well, she evidently did not leave it for you. Yes, I'll call you up if she does. No, I really don't know where you can find a competent laundress. Yes, I'll let you know if I should hear of one. Certainly. Glad to—Good-bye."

(*Enters Mrs. Baron and Mrs. Schafer.*)

ASTER: "Good morning, ladies."

MRS. BARON: "Do you carry Mah Jong Sets?"

MR. ASTER: "No, I'm sorry, we do not."

MRS. SCHAFER: "I'd like a hundred clothes pins."

MR. ASTER: "I'm sorry, we don't carry them."

MRS. BARON: "Well, perhaps, I could get a hundred two cent stamps."

MR. ASTER: "Really, I'm sorry to disappoint you, but I could not let you have that many; we carry only such an amount as to help our customers out and mostly at night, as the post office is on the next corner."

MRS. BARON: "I'm perfectly well aware of the location of the Post Office." (Turning to Mrs. Schafer): "My dear, did you ever see anyone so unaccommodating?"

MRS. SCHAFER: "Indeed, I never did, my dear, and such a poor stock; we certainly need another drug store out here; perhaps it would improve the service."

(*Exit ladies.*)

(*'Phone rings loudly.*)

(*Mr. Aster throws up both hands and answers 'phone.*)

ASTER: "Hello—Yes, Mrs. Moore. No, I can't think offhand of anyone who wants a kitten. Yes, I'll tell them if I do—no trouble—good-bye."

(*Enter Pill, Jack and Harold.*)

PILL: "Here we all are; darned coal truck broke down in the tracks and stalled our car."

ASTER: "Good morning, boys. Well, it's a good thing I was here on time or the whole borough would have gone to the dogs; that blamed 'phone has rung a hundred times."

PILL: "Business?"

ASTER: "No, accommodations, information, etc."

(*Pill, Jack and Harold retire behind prescription case.*)

ASTER: "Here, Mr. Pill, are two prescriptions to be filled and sent right over to Mr. Stevens, and a bottle of citrate goes also. And Harold you had better start a new flock of citrate, as that batch you made yesterday won't last till noon at the rate it has been going."

(*Pill comes to Prescription door and takes the two prescriptions while Harold makes noise behind prescription case indicating the starting of the citrate.*)

(*Enters Betty.*) (*Harold just coming front.*)

HAROLD: "Well, well, here's our little Sheba. Did she get her beauty sleep?"

BETTY: "Out of my sight! I feel like Rome on the morning after the fire."

HAROLD: "Danced till two, I expect, and all burnt out."

MR. ASTER: "Good morning, Betty. Guess you can start the dusting." (Betty complies.) (Harold disappears behind prescription case.)

(*Ichthyol has been sweeping the store and prescription room and has disappeared out in front to sweep the sidewalk.*)

(*'Phone rings—Mr. Aster answers.*)

MR. ASTER: "Yes, Mr. Mortimer—two pounds of cotton, certainly, send it right over."

(*Ichthyol re-enters front door singing.*)

ICHTHYOL (singing): "The old cat's whiskers are turning gray—he's just a lonesome kitty now."

MR. ASTER: "Here, Ichthyol, take this cotton right over to Mr. Mortimer's funeral parlors; go around the back way, and if no one is there just open the door and put it on the table."

ICHTHYOL (attitude of paralysis from fear, eyes widening): " 'Deed, boss, I wish that undertakin' man would trade some place else. Last time I went thar and opened that door, warn't nobody thar 'cept a dead man layin' on a table—Honest, boss, I do sure wish I could disseminate that place from my habitats."

MR. ASTER: "Bosh! Ichthyol, dead men can't hurt you."

ICHTHYOL: "Well, none of us ain't never been dead, so we ain't sure."

MR. ASTER: "Well, make it snappy, Ichthyol, there's a lot of work to be done today, so hurry back."

ICHTHYOL (Starting reluctantly with the cotton): " 'Deed, boss, hurrin' *back* from that place is somethin' I won't do nothing else *but*." (Exit Ichthyol.)

(*Betty is arranging candy, perfumes, etc., dusting as she goes.*)

(*Mr. Aster is charging cotton to Mr. Mortimer.*)

(*Enters Willie Foster, carrying two empty citrate bottles.*)

WILLIE FOSTER: "Please, Mr. Aster, my mom's sent these bottles back and said to give her some Elephant's Sauce for them."

(*Juvenile part.*)

MR. ASTER: "Some what?"

WILLIE: "Elephant's Sauce." (Light dawns on Mr. Aster and his face breaks into broad grin.) (Evidence of mirth from Betty and rear of prescription case.)

MR. ASTER: "Oh, you mean Epsom Salt, Willie?"

WILLIE: "Yes, that's it." (Mr. Aster hands him package.)

MR. ASTER: "There you are, son, good-bye."

WILLIE: "Good-bye, Mr. Aster." (Exit Willie.)

(*Pill comes front with prescription in hand.*)

PILL: "What do you think this is?"

ASTER (Takes prescription and looks at it): "Blessed if I know."

(*Harold and Jack come forward and cluster around the prescription—even Betty comes.*)

HAROLD: "Betty ought to know, anyone who can read those letters that sheik of hers writes, can read anything."

BETTY: "Hush up! Be yourself."

MR. ASTER: "I have it! It's Nux Vomica. See there—Ext. Nucis Vomicæ. It goes with the other ingredients, too, and in capsules."

HAROLD: "If that spells N-u-c-i-s, I'm an Eskimo." (Takes the prescription and turns it upside down.)

JACK: "You poor nut, you can't read it upside down. (Turning to the others.) He's so dumb, he thinks Muscle Shoals is a liniment. The other day in the class on bandaging and minor surgery, Prof. Wood asked him what he would do if a man were brought in bleeding profusely from the head, and our bright and promising young assistant here answered that he would put a Tourniquet around his neck." (Big laugh by all.)

HAROLD: "Well, it would stop the flow of blood and keep the floor clean."

(*At this point, enters Mr. Reynolds.*)

ASTER: "Good morning, Mr. Reynolds."

REYNOLDS: "Good morning, Mr. Aster, I'd like a pound of salts of lemon."

ASTER: "A pound of salts of lemon? Why, what in the world do you want with all that salts of lemon?"

REYNOLDS: "Our lodge is having a blowout, and I want to use it in the lemonade."

ASTER: "Well, I guess you don't. That's enough salts of lemon to kill the entire local membership."

REYNOLDS: "Well, I used it before, and we are all alive and prosperous."

ASTER: "Sure you don't mean Citric Acid?"

REYNOLDS: "Well, maybe it was."

ASTER: "That's more like it." (Gets the citric acid, weighs it out.)

REYNOLDS: "Guess you might as well charge it to the lodge."

ASTER: "All right, Mr. Reynolds, thank you; hope you have a good turn-out."

REYNOLDS: "Yes, I hope so, good-bye." (Exit Reynolds.)

(*Enters Mr. Walters—Salesman.*)

WALTERS: "Good morning, Mr. Aster. Hello, Betty; hello, Mr. Pill, Jack, Harold!"

ALL: "Hello, Mr. Walters."

HAROLD: "How's the Anti-pneumococcus salesman this bright A. M., and all the little pneumococci?"

WALTERS: "I see you know our line, Harold; that shows we are putting it over."

MR. ASTER: "Come on back, Walters, and I'll go through the want-book with you." (Walters and Aster disappear behind the prescription case.)

(*Enter Mr. Gray.*) (*Mr. Pill comes forward.*)

MR. PILL: "Good morning, sir."

MR. GRAY: "Good morning. I want about fifty 1 gr. strychnine tablets."

MR. PILL: "Would you mind telling me how you intend using them?"

MR. GRAY: "Why, my wife is going to take them."

MR. PILL: "Really, Mr. Gray, I did not know there was any domestic trouble in your home."

MR. GRAY: "What in the world are you driving at?"

MR. PILL: "Why, man, one of those tablets would kill your wife."

MR. GRAY: "Well, I don't know anything about it. Our next door neighbor said her doctor gave her a prescription for some heart tonic tablets, and she read it and was sure that's what it was, and they helped her so much, my wife thought she would try them."

MR. PILL: "You can see for yourself that that is a dangerous practice, Mr. Gray, and perhaps strychnine would not be the right thing at all for Mrs. Gray. Really, as your friend, I'd advise you to have Mrs. Gray consult her physician if she is not feeling well."

MR. GRAY: "Sure, you're right. I told her that myself, but you know how women are; but she will do it, now that you said so. Much obliged for your kind information."

MR. PILL: "Not at all; glad to be of service, good-bye."

MR. GRAY: "Good-bye." (Exit Gray.)

(*Enter Sally Flapper.*)

BETTY: "Oh, hello, Sally. How are you?"

SALLY: "Why, hello, my dear. I want to get this compact refilled. They are such a nuisance to refill yourself. Oh, aren't those perfumes adorable? How much are they? Gee, it must be grand to work with all this classy stuff. (Harold hearing feminine voice, appears from prescription room.)

(*Joins girls. Leans on counter and beams at Sally.*)

"Oh, hello, Harold; my, but you look stunning in that white coat and so professional looking. (Harold straightens up and assumes professional and dignified attitude.)

(*Pill's voice from prescription case.*)

PILL: "Harold, do you want this citrate to boil to evaporation?"

HAROLD: "Oh, pardon me, Sally, I have a laboratory process which I am supervising back there." (Harold dashes through prescription door.)

SALLY: "Really, my dear, I think he is adorable. It must be wonderful to work with him."

BETTY: "Wonderful is not the word. It's—it's—nothing short of heroic. Here's your compact, Sally. Anything else you would like?"

SALLY: "Yes, about ten 2-cent stamps and a package of Spearmint and two hairnets." (Betty gets them, makes change, etc.)

SALLY: "Doin' anything Friday night?"

BETTY: "No, can't think of anything."

SALLY: "I'll get Dick and you bring Harold and we'll go to that picture at the Grand—you know, Thomas Meighan in "Flaming Love," and then we can go back to the house and dance and have some eats. You like Dick so well, you know."

BETTY: "And I suppose you can tolerate Harold?"

SALLY: "Why, you goose, he never asks me to go out, so I have to engineer the thing myself. 'Bye, honey."

BETTY: "'Bye, Sally—I'll ask Harold." (Exit Sally.)

(*Harold comes out from behind prescription case.*)

HAROLD: "What did she say about me, Betty?"

BETTY: "She wants me to bring you to her house Friday night; she will get Dick and we four can go to the movie, and then go back to her house for eats and dance."

HAROLD (beaming): "Sure!"

BETTY: "But I thought you couldn't go her, Harold?"

(*'Phone rings.*)

HAROLD: "Well, I really used to feel that way about her, but she is the first girl that ever recognized my professional bearing."

(*Betty explodes.*) (*Harold answers 'phone.*)

HAROLD: "Hello. Yes, Dr. Browning—Oh, really? Oh, that's too bad. Very serious, Doctor? I'm so sorry. Yes, indeed, Doctor. Yes, sir, at once."

HAROLD (loud): "Poor Janette Baker has diphtheria. Dr. Browning just 'phoned. Says it's very serious, may not pull through —wants some Diphtheria Antitoxin."

(*All coming running forward.*)

BETTY: "The poor little darling."

ASTER: "Such a sweet child."

HAROLD: "I wonder where Ichthyol is?"

PILL: "Probably died from fright."

HAROLD: "I'll run over to Baker's with the antitoxin myself."

JACK: "No, for Pete's sake, finish up your citrate. If you were a high-salaried man, it would cost two dollars a bottle for that batch, judging by the way you stall around. I'll go, I'm through with my work." (Takes package of antitoxin and leaves.)

ASTER (calls to him): "Tell Mrs. Baker that we will be ready to help her day or night."

(*All retire to prescription room, except Betty.*)

(*Enters Alec Smart.*)

SMART: "Hello, bright eyes! Have you any Sheik's Hair Pomade?"

BETTY: "Right here, sir."

SMART: "What an exquisite complexion you have; you must use wonderfully expensive soap."

BETTY: "I use Ivory—99-44/100 per cent pure. Here's your package—60 cents, please."

(*Smart pays her and grabs her hand. Betty jerks away, rings up the 60 cents.*)

BETTY: "Close the door going out, please." (Exit Smart.)

BETTY: "Fresh guy." (To herself.)

(*Enter Ichthyol.*)

PILL: "Here, Ichthyol, take this package over to Mrs. Stevens; $2.35 if she wants to pay you."

ICHTHYOL: "Thas more like it—ain't no dead folks there—yet."

(*Exit Ichthyol. Enter Jack.*)

JACK: "Poor little child is very low. We would miss her in the neighborhood if she would leave us. I gave your message to Mrs. Baker, Mr. Aster, and she said it was such a comfort to have a reliable pharmacy so close."

(*Aster and Walters come front from behind prescription case.*)

ASTER: "Yes, I'll be ready for a night call and we will do anything in our power for them."

WALTERS: "Good-bye, Mr. Aster, thanks for the order; good-bye folks."

ASTER AND CLERKS: "So long, Mr. Walters."

ASTER: "Now, this is my afternoon off, and it happens to be Founders' Day, with a big program at the College. I'm going; and Jack and Harold, you can flip a coin to see which one of you can go; that will leave three of you, with Ichthyol to run errands and deliver, so I guess you can get along."

(*Harold and Jack flip a coin.*)

HAROLD: "I'll take heads."

JACK: "Well, it happens to be tails."

HAROLD: "I never did have any luck. Well, give my regards to the Admiral, the Dean, and the rest of the Faculty, and tell them I'm sorry but my professional duties necessitate my presence here, but I hope it will be a successful affair, anyhow."

JACK: "Well, they will be greatly handicapped by your absence but I'm sure they will do their best. Thank you, Mr. Aster, for permitting me to go."

ASTER: "You're perfectly welcome, Jack; I'm sorry we can't all go, but our duty to our customers is to be here when they need us."

PILL: "I just happened to think of some bad news."

HAROLD: "What?"

PILL: "The second installment on my Building and Endowment Fund pledge is due."

MR. ASTER: "That's right, but I guess we are all glad to pay it to the old Alma Mater." (Enter Mr. Thomas.)

THOMAS: "Doc, I'm having some of the boys over tonight for a little session, and I want to get a quart of good stuff."

ASTER: "Is that so? Where are you going to get it?"

THOMAS: "Why, you will let me have it, won't you?"

ASTER: "Positively not! And let me tell you, Thomas, if I did not know you so well, and did not feel that you mean no insult by placing me in the same class as a bootlegger, I'd throw you out."

THOMAS: "Well, don't get sore, Doc. You and I have always been friends, and I thought you would sell me a quart just as a little friendly act."

ASTER: "That would not be friendly, as you would unconsciously lose your respect for me, and I would lose my self-respect. Regardless of what either of us might think of the Eighteenth Amendment, it's against the law, and I would not let my own brother have any liquor from this store without a lawful prescription."

THOMAS: "Well, that's all right, Doc, as far as it goes, but I think you are making a mistake; there are plenty of fellows selling it and they are cleaning up and taking life easy, while you still make pills and fill prescriptions at the same old stand, early and late."

ASTER: "Yes, and Thank God for the chance to be respectable and of service to my people. My long years of service as a pharmacist have taught me that there is much more to the practice of pharmacy than its mere emoluments. In the final analysis suffering humanity is the most important thing to be considered. Here is where we need the highly trained pharmacist, who loves not only his work but his fellowmen, who practices his profession in the fellowship of love and service, of mutual aid and sympathy to the sick, and who gains and uses all the knowledge possible in this spirit. I thank God for this Founders' Day, the one hundred and third anniversary of the birth of American Pharmacy, and for the privilege of helping my Alma Mater in her preparations for a noble work in the coming century."

(*Curtain.*)

FINIS.

ABSTRACTED AND REPRINTED ARTICLES

THE IODINE CYCLE.*

By Dr. Th. v. Fellenberg, of Bern.

(*Translated by Henry Leffmann.*)

Investigations into the occurrence of iodine, confirm the statement of Chatin about the middle of the last century, that it is a widely distributed element. Relatively high content is shown by many rock-materials, the sedimentary types being on the average richer than the primitive ones. It is found in sea water and in sea salt, but the content is kept low by the constant secretion by the organisms present, most of these being distinctly rich in iodine. Fresh waters contain much less than salt, as might be expected, and though the fresh-water life secretes the elements as do the salt-water forms, the content of the former is, of course, lower.

The iodine in the rock masses is not readily available to plants, inasmuch as it is not very soluble. A portion passes into solution with the dissolving of calcium carbonate, as carried on by plants, but much of it is held as silicate. Finely powdered rocks and earth absorb the element, but in different amounts. Free iodine can be taken up by organic matters in the soil, but iodides may be decomposed by inorganic catalysts and some of the element caused to escape into the air. Natural waters containing iodine compounds may lose a portion of their content by such escape. However, the iodine content of the air is always very small.

The iodine-cycle may be set forth as follows:

The primitive rocks have obtained their iodine from the original earth-magma. By weathering, these have yielded steadily their iodine as either alkali- or alkali-earth iodides. Part of these has been taken up (absorbed) by the weathered material, which is thus enriched in iodine content. Another portion of the iodides is decomposed by

*Abstract of an article presented to the Pharmacy Section of the Swiss Society of Natural Sciences, at the meeting at Lucerne, October 2-4, 1924.

catalytic action and escapes into the atmosphere in the elementary form. The remainder finds its way into the streams and finally into the sea. The greater portion of the iodine of the fundamental rock masses, however, does not suffer these transfers, but becomes part of the salts of the fresh-water plants and thus enters the fluids of fresh-water animals. The iodine that finds its way into the sea, passes in small proportion into the air as the free element, but mostly into the fluids of sea plants and from them into the fluids of sea animals. Dead animals thrown on the strand lose their iodine content partly to the air, partly to the soil. The deep sea organisms add their iodine content to the deposits on the sea bottom, which in turn send this through the cycle as indicated.

The iodine content of the atmosphere is in small part taken up directly by plants, but mostly returned to the earth by rain, being thus made available for plant life. Soil rich in humus can take up the element readily, while that poor in humus holds it but feebly and most of it passes into the subsoil water. The power of weathered rock material to absorb iodine operates against the solution of it by ground waters, and the relative distribution between these will depend on many conditions. Temperature, season, humidity, porosity of soil and the bacterial flora are all influencing conditions.

Human beings get iodine from the air, from water and occasionally from common salt, but in greater part from foods, among which vegetables, eggs and milk are to be noted, but the larger source is from water plants and animals, especially those of the ocean, in which the iodine content is the highest. As with other common animals, the majority of the iodine excreted is through the kidneys, but other excretory organs are also active.

It seems to be proved as the result of recent researches that the incidence of goitre is dependent on the amount of iodine contained in the food supply of the region. An indication of iodine starvation is to be found in the iodine content of the urine. In certain districts of Switzerland, the iodine content is very low and in others relatively high. In the former goitre prevails, in the latter it is far less in evidence.

OBITUARY

THOMAS De ARMOND McELHENIE.

"I have done nothing notable but have tried to keep the faith in good pharmacy." This is the self testimony of the late Thomas D. McElhenie.

And this is how he kept the faith, not in pharmacy alone but in life itself:

For over fifty years—a respectable, respectful and respected member of the American Pharmaceutical Association.

For the same period—a Freemason, living close-hewn to the standards of that high and ancient order.

And for a little less than fifty years—a practical pharmacist, ministering to the wants of one substantial community, whose interests he continuously served throughout these many years and in whose esteem he grew with every year that passed.

Surely a man in whose life half centuries of several activities were ordinary achievements, must have "kept Faith in all good things." Surely such a man had only modesty that made him speak of accomplishing "nothing notable." His constancy, sparkling gem-like in an age of ever-changes, forbids modesty to call it "nothing notable" and the wealth of friends in whose hearts is sadness at the loss of him know also of his sterling worth and of the truly "notable things" with which his life was filled.

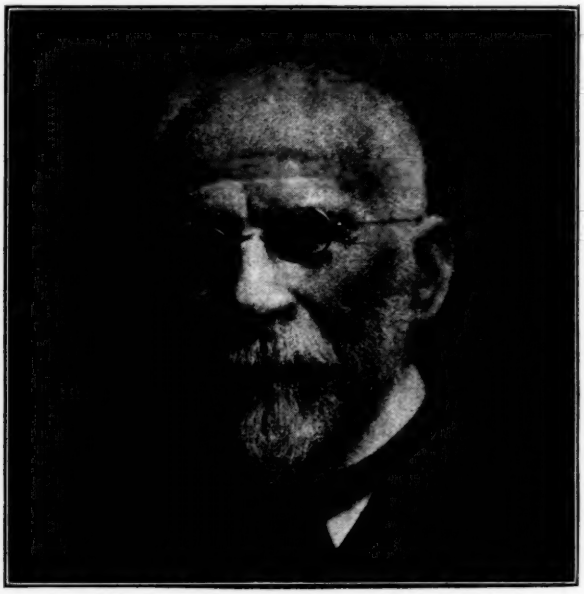
This story of the venerable gentleman who was so familiar to those who attended the conventions of the American Pharmaceutical Association, is based on data appearing in an article published in a contemporary journal.*

After an illness of eight days, Thomas De Armond McElhenie, widely known as the dean of pharmacy in Brooklyn and an honorary president of the American Pharmaceutical Association, and also of the New York Veteran Druggists' Association, died on Thursday, November 27, at his home, 266 Ryerson Street, Brooklyn, New York. He was seventy-five years old and a native of Easton, Ohio, where he was born on October 15, 1849. For forty-six years, or from 1876 until 1922, he had continuously conducted a pharmacy

* *Pharm. Era*, 1924, 605.

at the corner of DeKalb Avenue and Ryerson Street, Brooklyn, and his store was a landmark known to thousands from all parts of the country who during those years had been students at Pratt Institute, a few doors away.

Mr. McElhenie was known as the historian on local pharmaceutical subjects in Brooklyn and Manhattan and had contributed numerous articles to pharmaceutical journals. He was likewise a contributor of numerous formulæ to the National Formulary and took part in the editing of the first edition of that work, acting as a rep-



THOMAS D. McELHENIE.

(Courtesy of *Pharmaceutical Era.*)

resentative of the Kings County Pharmaceutical Association of which latter body he was a charter member. He was one of the oldest graduates of the Philadelphia College of Pharmacy from which he graduated in 1872, and was likewise one of the oldest members of the American Pharmaceutical Association, joining that body in 1872. The national body made him an honorary president at its Cleveland convention in 1922 in observance of the fact that fifty years prior to that Mr. McElhenie had attended a similar convention of the body in the same city.

The deceased was also a charter member of the New York State Pharmaceutical Association and of the New York Branch of the A. Ph. A. One of his principal objects of interest was the Brooklyn College of Pharmacy, in the establishment of which he had a large part.

In a contribution to the Journal of the A. Ph. A. in 1917 under the heading "Reminiscences," Mr. McElhenie told of his career in pharmacy. He entered the drug business in 1865 as a porter, clerk and general utility man for Zimmerman & Company, wholesale and retail merchants of Wooster, Ohio. In the early summer of 1870 he met Abraham Boyd, salesman for James R. Nichol & Co., of Boston, and an alumnus of the Philadelphia College of Pharmacy. Mr. McElhenie was then senior drug clerk for Zimmerman & Company. His new-found friend advised him to go to the Philadelphia college and "be somebody." He took the advice with the consent of his father and his employers. Having to earn his living while studying, he set out to get a job immediately on arrival in Philadelphia. His first acquaintance in that city, Wellington Boyle, an Irish Quaker and head clerk of the retail department of Charles Ellis' establishment there, advised him that the best way to get a job was to "just beat up the town" or in other words walk up one street and down the next, inquiring at every drug store. He did that and at the end of the fourth day landed a job in the drug store of Lancaster Bros., at Tenth and Arch Streets, just across the street from the place he was boarding and the nearest drug store to the Philadelphia College of Pharmacy where he had become a student. Lancaster Bros. were successors to William Hodgson, who for a time was a partner of Daniel B. Smith, first president of the American Pharmaceutical Association.

After graduation in 1872 Mr. McElhenie returned to Ohio and took employment as chemist with the firm of Benton, Myers & Canfield, Cleveland. There he was named a delegate to the A. Ph. A. convention in Cleveland at which he developed a friendship with Prof. P. W. Bedford, Albert E. Ebert and Prof. Remington. In 1874 he engaged with George C. Sands, who conducted a pharmacy in Sixth Avenue, New York, opposite the present Hippodrome.

Two years later, or in 1876, he had one of his most eventful years. In March of that year he established the drug store which he conducted continuously for forty-six years at Ryerson Street and De Kalb Avenue, Brooklyn, and in September he was married in

Philadelphia to Miss Bella Osborne, of Wooster, Ohio. He also received his degree in Masonry in the same year. He became master of his Masonic lodge in 1887. On July 1, 1922, he sold his store. He leaves one son, Frederick McElhenie, and three daughters, his wife having died July 3, 1921.

Funeral services were held at his late residence on Sunday afternoon, November 30, there being two separate ceremonies which were attended by about sixty persons, including many men prominent in pharmaceutical circles, as well as in other lines of endeavor. The first ceremony was a Masonic service, which was followed by the formal Presbyterian rites performed by the family pastor. Among those who were present were Dr. Henry Arny, Dr. H. N. Fraser, Dr. William C. Anderson, Reginald E. Dyer, Thomas J. France, H. A. Herold, H. Kantrowitz, Charles F. Keale, Thomas J. Keenan, Robert R. Lampa, J. Leon Lascoff, Robert S. Lehman, Adrian Paradis and Otto Raubenheimer.

Following the services the body was taken to the old family home in Wooster, Ohio, for interment.

SCIENTIFIC AND TECHNICAL ABSTRACTS

NORMAL TEMPERATURES OF ANIMALS.—A fact noted by biologists, but not generally known, is the variety of body temperatures considered normal for animals. Pasteur was well aware of these variations for in his experiments with the anthrax bacillus he records this information. It is also accepted that these peculiarities in body temperature have largely to do with the special immunities possessed by certain animals against certain bacteria.

Man will draw little comfort from the fact that his neighbor on the scale of thermometric figures is the donkey with a normal temperature of 99 Fahrenheit. Anti-evolutionists, irritated with the evidence that man's blood compares well with that of the simians from immunologic viewpoints, may draw comfort from a very marked difference in their normal body temperatures—for the normal degree of the monkey is 104 Fahrenheit. The following table furnishes the normal temperature of most living creatures:

Man,	98.4	degrees	Fahrenheit
Donkey, elephant,	99.0	"	"
Tiger, rabbit, horse,	100.2	"	"
Cow, dog, cat, rat,	101.4	"	"
Wolf, pig,	102.5	"	"
Goat, monkey, sheep,	104.0	"	"
Goose, fowl,	107.0	"	"
Pigeon, turkey,	109.0	"	"
Water-fowl, duck	111.0	"	"

A NEW FORM OF COPPER.—The News Bureau of the General Electric Company announces that by very slow cooling of melted copper, Dr. Davey of the Research Laboratory of the company, has succeeded in obtain bars having peculiar physical properties. The metal conducts electricity better than any form of copper heretofore obtained and even better than silver. A striking feature is that, as produced, the bar can be bent with a very slight effort, but cannot be straightened without considerable force. Dr. Davey regards the primary condition as that of a large crystal, which by the bending passes into a large number of smaller crystals. It would seem, however, that the condition might be a purely amorphous state, a sort of colloid condition, analogous to the state of superfusion and to the well-known phenomena of suspended crystallization. Bars about 10 cm. long and nearly 2 cm. diameter have been obtained.—H. L.

GENERAL ORGANIC CHEMICALS—CENSUS REPORT.—The Department of Commerce announces that, according to the data collected at the biennial census of manufactures, 1923, the total production, for sale, of organic compounds not covered by special chemical groups and not including alkaloids, coal-tar derivatives, and synthetic plastics, as reported by establishments engaged primarily in the manufacture of chemicals, was valued at $75,914,191. This total represents an increase of 70 per cent. as compared with $44,661,100 in 1921 and of 5.2 per cent. as compared with $72,141,542 in 1919.

The production, for sale, of the leading compounds in this miscellaneous group of organic chemicals, as reported for 1923, was as follows (the items being listed in the order of their value): Refined glycerin, 74,104,854 pounds, valued at $12,214,012; formaldehyde, 20,213,873 pounds, valued at $2,604,061; ethyl acetate, 2,529,788 gal-

lons, valued at $2,192,989; acetone, 8,742,805 pounds, valued at $1,864,986; carbon bisulphide, 25,000,967 pounds, valued at $1,337,024; and vanillin 227,997 pounds, valued at $1,326,935.

MONEL METAL.—Monel metal, which has gained considerable favor in the United States for resisting most forms of corrosion, consists of roughly 67 per cent. nickel, 28 per cent. copper and 5 per cent. of other metals. It contains no tin, zinc or antimony, and is made direct from the ore without separating the constituent metals. In appearance it resembles nickel, taking the same high finish, but it has a somewhat softer and more silvery lustre. It has the strength, toughness and ductility of steel, and resists corrosion better than copper, gunmetal and bronze. It machines easily, and can be rolled, drawn, cast, forged, soldered and welded. The hot rolled metal has a tensile strength of thirty to forty-two tons per square inch, according to size and treatment, while ordinary cast monel metal has a tensile strength of nineteen to twenty-five tons per square inch, according to the character of the casting.—*Chemical Age.*

GOSSYPOL, A POISONOUS COTTON SEED CONSTITUENT.—"Gossypol," a substance recently discovered in cotton seed, is believed to be responsible for the occasional poisoning of cattle fed on cotton seed, by chemists of the United States Department of Agriculture. The name of the new poison is derived from "Gossypium," which is the botanical name of cotton. Tests on animals with the pure extract produced the same symptoms as typical cotton seed poisoning.

Further tests showed that the more poisonous varieties of cotton seed contained higher concentrations of the new substance than did harmless kinds. Cotton seed produced in different regions contains varying percentages of gossypol; thus cotton seed of the Atlantic coast states contain more than does the seed of the southwest, and cotton seed poisoning of stock is more frequent in the former region.

SILICA IN PLANT GROWTH.—Messrs. D. R. Nanji and W. S. Shaw (Bio-Chemical and Brewing Department of the Birmingham University) contributed a paper on the "Role of Silica in Plant Growth; its Assimilation and Physiological Relation to Phosphoric Acid." From the time that Liebig first propounded his "mineral theory" of plant concentration it had been universally recognized that there are certain elements absolutely es-

sential for the normal nutrition of plants. According to this doctrine the fertility of the soil and the efficiency of manure were solely ascribed to the nature and assimilability of the manurial constituents comprising them. It was soon recognized, however, that the fertility of a soil was not directly proportional to the amount of its manurial constituents, but that it was influenced considerably by the nature of the organic nutritive minerals. Our view on the artificial fertilization of land had undergone considerable modification, more especially when viewed from the standpoint of the colloidal and the biological conditions existing in the soil. We have come to regard elements such as nitrogen, phosphorus, potassium, calcium, magnesium, sodium, sulphur and iron as requisite for perfect growth, and in addition it was now held that certain elements such as boron, fluorine, iodine, silicon, aluminium, manganese and zinc, which had been known to exert a toxic effect towards plants when present in concentrations above a certain limit, had, in fact, when presented to plants in very minute amounts not only a stimulating and beneficial effect, but might even be essential in some cases. Experience had taught agriculturists that silica-free plants were at a disadvantage compared with plants grown with the normal supply of silica. Silica was capable of increasing growth; and such beneficial effect was particularly marked in the case of soils deficient in phosphorus, as had long been experienced in Rothamsted field experiments. Details were given of experiments showing the relationships of the element silicon to phosphorus.—(*The Chemical Age.*)

EXPERIMENTS WITH POISONED CIGARETTES.—Parallel with the shibboleth so frequently heard half a century ago in connection with the active total abstinence movement, that all the injury done by alcoholic beverages was due to "impurities" (a cry that finds frequent expression nowadays in the "poison rum" talk), is the claim that cigarettes are specially injurious on account of the arsenic and opium they may contain. There seems to have been no instance definitely established of such contamination, nevertheless the cry occasionally appears. An investigation to determine how far such contamination might involve danger is reported from Roumania. The original article by Mr. J. Ventilesco and Miss V. Steflea was published in the *Bulletin of the Roumanian Chemical Society,* (1924, p. 46), but this is not accessible. An abstract is given in *Jour. Pharm. Chim.*, [7], 1924, *30*, 163, from which the data are taken.

The investigators made mixtures of tobacco with potassium cyanide, mercuric cyanide, arsenous oxide, extract of opium, morphin and cocain, all in the proportion of 0.300 gram to each cigarette (about 4.5 grains). They then apparently sat down to a "social hour" with these coffin nails and they report that all of the substances modify the flavor and the manner of burning so much that it would be impossible for any one to smoke them unawares. Moreover the proportions of the ingredients that appear in the smoke is in all cases very small.

The experiments were undertaken to determine if criminal poisoning could be induced by such means, and seem to negative the probability. They throw no light, however, upon the question whether the continued use of tobacco containing minute amounts of potent drugs will give rise to chronic poisoning, but the danger from such source is remote. H. L.

NEWS ITEMS AND PERSONAL NOTES

This Journal extends to the following gentlemen its congratulations upon their recent election to office in the American Pharmaceutical Association: President, L. L. Walton, Williamsport, Pa.; first vice-president, William C. Anderson, Brooklyn, N. Y.; second vice-president, Clyde L. Eddy, New York City. For members of the Council, H. C. Christensen, Chicago, Ill.; S. L. Hilton, Washington, D. C.; Julius A. Koch, Pittsburgh, Pa.

NUMOQUIN BASE AND NUMOQUIN HYDROCHLORIDE.—The House of Merck makes the following suggestion: In view of the very intense action of Numoquin, pharmacists will do well to note the following suggestions and cautions:

Numoquin is supplied in two (2) distinct forms, the Base and the Hydrochloride.

Numoquin Base which is *not* soluble in water, is used internally in the specific treatment of pneumonia.

Numoquin Hydrochloride in aqueous solution or in an ointment is used locally in sepiginous corneal ulcer and by intraspinal injection in pneumococcic meningitis. The Hydrochloride is not to be used internally.

The solubilities and therapeutic uses of Numoquin Base and Numoquin Hydrochloride are separate and distinct.

It is important that it be clearly indicated on orders and prescriptions whether the Base or the Hydrochloride is desired.

MULFORD ANNOUNCES NEW PRODUCT.—Many of our readers will be glad to learn that Pneumococcus Antibody Solution, which has heretofore been available only "for experimental use," is now obtainable for use in general practice.

The satisfactory results obtained by the use of Pneumococcus Antibody Solution in the Bellevue and New York Hospitals, New York City, have warranted the H. K. Mulford Company undertaking its production on a scale necessary to meet the needs of the general practitioner.

Pneumococcus Antibody Solution is supplied from any of the Mulford branches or distributing agencies, in vials of 50 cc., or in packages containing four 50 cc. ampuls.

Further information and clinical data may be had by writing to H. K. Mulford Company, Philadelphia, Pa., and mentioning this Journal.

THE COMMONWEALTH STUDY OF PHARMACEUTICAL EDUCATION.—This is the third of a series of twelve monthly statements to be issued by the staff conducting this study. These bulletins are issued to acquaint the profession with the progress of the study.

As stated in Bulletin No. 2, a study of Pharmacy from the functional standpoint would divide itself primarily into three major sub-divisions, *viz.*, the knowledge, skill and ideals necessary to—

(1) fill prescriptions;
(2) answer queries involving pharmaceutical knowledge;
(3) conduct the commercial side of the business.

The objectives of the study are then—

(a) to provide the raw material for a course in Pharmacy based on the knowledge necessary to fill prescriptions and to answer queries involving Pharmaceutical knowledge;
(b) to provide the raw material for a course in Commercial Pharmacy based upon a job analysis of the commercial duties, problems and difficulties of pharmacists.

It was decided early in planning this study to work only toward the first objective. It is obvious that in a study of the information, skill and ideals involved in the filling of prescriptions, it would be essential to have a complete list of the items appearing in prescriptions. Such a list when properly classified would be basic to many branches of the whole study.

In the compilation of this list of items, it was necessary first to collect copies of prescriptions from the prescription books of pharmacists. About twenty thousand copies were collected from centers as follows:

East—Boston, Mass.; New York, N. Y.; Pittsburgh, Pa.; Philadelphia, Pa.; Buffalo, N. Y.

West—Lincoln, Neb.; Seattle, Wash.; Salt Lake City, Utah; Los Angeles, Cal.

Middle West—Chicago, Ill.; St. Louis, Mo.; Norman, Okla.; Minneapolis, Minn.

South—Richmond, Va.; New Orleans, La.

A complete list of the items appearing in prescriptions hereafter, referred to as the "Type of Ingredient List" was drawn from 16,000 prescriptions and included 1827 different items, with a total frequency of 39,880.

A summary of the Type of Ingredient List gives the following information:

1. Frequency of each ingredient in the 16,000 prescriptions studied.
2. Frequency of each group of ingredients such as salts, tinctures, alkaloids, etc.
3. In which group of 500, each ingredient first appeared.
4. Number of ingredients appearing for the first time in each group of 500.
5. Rank of each ingredient as related to the total number of ingredients.

The Type of Ingredient List is also basic to the following studies which will develop the objective of the whole study. Pharmacology, Dosage, Toxicology, Physiology, Botany, Chemistry, Bacteriology, Preservation, Adulteration and Contamination, Nomenclature, including Latin, Arithmetic and Physics.

Throughout this study a rather unique scheme called "partitive sampling" is being employed. In the compilation of a list of different ingredients found in prescriptions this method was indispensible. The 16,000 prescriptions were studied in groups of 500 and new ingredients noted as each group was completed. This method of grouping gives rise to the term "partitive sampling." Three hundred and sixty different ingredients appeared in the first group of 500, 220 new ones in the second group, 135 in the third group and so on until the twenty-ninth group, when only one new ingredient appeared.

When this point was reached, new ingredients then became so rare that the study was stopped at the thirty-second group.

A study of the Latin included in these prescriptions was conducted along the same lines. The next bulletin will contain facts developed in the study of Nomenclature.

British Chemists' Exhibition.—The twenty-ninth Chemists' Exhibition, organized by the "British & Colonial Pharmacist," will be held in the Holland Park Hall, London, W., from May 4-8, 1925. All members of the drug and chemical trades who are in England during the week will receive a cordial welcome on presentation of their professional or business cards.

BOOK REVIEWS

A Systematic Handbook of Volumetric Analysis. By Francis Sutton, F. I. C., F. C. S. 11th edition, revised throughout with numerous additions, by W. Lincolne Sutton, F. I. C., and Alfred E. Johnson, B. Sc., F. I. C. 8vo. vii-629 pages, 120 illustrations, Philadelphia. P. Blakiston's Son & Co. $9.

Sutton's manual of volumetric analysis has been so long a prominent reference work that little else is needed than to record the appearance of a new edition, and to announce the thorough revision that the text has undergone. The first edition appeared a little over sixty years ago, when volumetric analysis was beginning to attract attention, but was comparatively limited in its trustworthy application. It found most extensive application in the determinations of acid-

imetry and alkalimetry, and in the valuation of commercial bleaching powder. Some chemists are still left who remember the special burettes that were used. Progress in the application of the principles of volumetric analysis was made steadily, and in several lines. The improvement in accurate graduation of instruments, the increase in knowledge of the characters of indicators, the introduction of accessories to facilitate reading of burettes, were among the important advances.

Thirteen years have elapsed since the tenth edition was issued. At that time the author was still living though not able to do active work in the revision. He, however, signed the preface. He lived to see the fiftieth anniversary of the publication of the first edition, which he regarded as the "least perishable work" of his life. The book has been out of print for several years, presumably in part due to the war, but now appears brought up to date and improved in form. One item of improvement in form is the printing of the procedures the same type as the text in general, a large, clear letter being used.

In the present edition the working chemist has a manual setting forth in clear and detailed language all the necessary data for the methods of volumetric analysis. Attention is called in the preface to the fact that Messrs. Hollings and Thomas, specialists in gas analysis, have prepared a section on that subject, a new feature, which constitutes a comprehensive, up-to-date little treatise such as has not previously existed in English.

HENRY LEFFMANN.

PROTEINS AND THE THEORY OF COLLOIDAL BEHAVIOR. By Jaques Loeb, 2d edition, 12mo, xiv-380 pages, numerous graphs. New York. The McGraw-Hill Book Co. $3.50.

This is one of a series termed the "International Chemical Series," edited by Dr. H. P. Talbot. It constitutes, probably, one of the more abstruse members of the series, for Loeb's work has been mostly in the recondite fields of biologic chemistry, and dealing, as the book does, with data and principles relating to colloids there will be additional complication. These remarks must, however, not be understood as disparaging the subject matter, for the problems of colloidal chemistry as applied to the phenomena of living organisms

represent the most important phase of biologic chemistry. It is probably, through this line that we will enter into some acquaintance of the essence of vital action.

In the preface to the first edition, which is reprinted, the author points out that his investigations have shown that an error was made in assuming that colloids absorb electrolytes according to a purely empirical formula, that is, do not obey the ordinary stoichiometric proportions. Loeb found that this error arises from a neglect to consider the hydrogen-ion concentration. When this factor is determined and applied it is found that the associations of acids and bases in colloid complexes follow the stoichiometric laws as rigidly as in complexes with crystalloids. Loeb gives a very apt sentence which should be impressed upon all chemists who are working in these fields. "As long as chemists continue to believe in a special colloid chemistry differing from the chemistry of crystalloids, it will remain impossible to explain the physical behavior of colloids in general and of proteins in particular. * * * What was at first believed to be a new type of chemistry, namely colloid chemistry, with laws different from those of general chemistry, now seems to be only an unrecognized equilibrium condition of classical chemistry, at least so far as proteins are concerned."

It is a great part of the results of true science to discover analogies where they are not evident on ordinary examination and to discover essential distinctions where appearances lead to supposititious analogies. The book in hand will serve an excellent purpose in stemming the tendency at present so noticeable, to take the chemistry of colloids out of the general science. There has been, indeed, of late years a strong drift of some phases of chemistry into physics. Many of the men who have taken a large part in the development of the modern theory of the nature of the atom, are more physicists than chemists, and there seems to be a steady movement towards the separation of chemists into two groups, those who pursue the more abstruse phases of physical chemistry and those who pursue principally the applied science. For the latter, the atom will probably long remain the unit of chemical action, the theories as to its intimate structure being ignored.

It has been long recognized that Graham's original classification of substances into colloids and crystalloids is untenable, inasmuch as a given substance can exist in either condition. Colloid and crystalloid are conditions of matter depending on the manner in which for-

mation has occurred. It is indeed, notable that the very substance from which the word crystalloid takes its origin—the quartz crystal —is capable of assuming a typical colloidal form. Loeb goes further in the concluding remarks on the data of his book saying that the distinction between colloidal and crystalloidal states cannot be maintained, but only a distinction between colloidal and crystalloidal "behavior," and instances proteins as substances that may in certain ways show the properties of one class and in some ways the properties of the other. In their relations to acids and alkalies proteins behave like amino-acids, which are crystalloids. That this fact has been so long overlooked is due to the omission to determine the hydrogen-ion concentration of the solutions.

Chemists occupied with biologic and especially with physiologic problems will find in Dr. Loeb's book much material of interest and importance to them. The mechanical execution of the book is entirely satisfactory.

HENRY LEFFMANN.

BOOK OF RECEIPTS containing a veterinary materia medica with prescriptions used in the treatment of the more common ailments of animals; a pharmaceutical formulary for the manufacture of proprietary articles, toilet preparations, etc., and a photographic forulary, etc. By E. W. Lucas, C. B. E., fellow of the Institute of Chemistry, and H. B. Stevens, O. B. E., fellow of the Institute of Chemistry, etc. 12th edition, 12mo, 473 pages cloth. Philadelphia, P. Blakiston's Son & Co.

While this book was written largely for the Empire it is notable that its scope is so broad and its character so cosmopolitan that it may serve with equal merit here as in any part of the British Empire.

This, the twelfth edition of a deservingly popular formulary, is an amplification of the former edition. The veterinary section has been particularly elaborated and the several departments considerably extended. Of particular interest is a note by the authors that recipes have been added for the manufacture of home-made wines, cocktails, ice creams, etc. In this country, of course, this interest is purely academic and the law-abiding citizen reads through these recipes much as he would read Caernarvon's Rape of Luxor. Yet some-

where in the world these recipes for home-made wines, etc., may have their usefulness.

The Imperial system is used throughout excepting in the chapter on analysis, and the American user will have need to keep this fact in mind.

Unlike many another formulary, this does not fill its pages with extraneous and antiquated items of general value and interest. Instead it aims to furnish usable and useful tables of constants and similar important data. For instance, a most valuable compilation, and one that is not elsewhere so accessible, is the series of normals for milk, cereals, and other foodstuffs.

The "impossibleness" of an accurate "revision" is again demonstrated in the fact that this book still quotes, in its table of foreign official alcohols, figures that have not been correct in this country for over two decades. Then there is the ever-current syrup of figs with no formula for its preparation. By and large, however, we heartily commend this book as a formulary of unusual merit and usefulness to practicing pharmacists.

IVOR GRIFFITH.

GUIDE PRATIQUE POUR L'ANALYSE DU SANG. Prof. Roger Douris, Univ. of Nancy, France. 469 pp. 58 illus.; cloth-bound. Vigot Frères, publishers, Paris. 25 fr.

Most appropriately named is this book, for it is eminently a practical guide, covering the analysis of blood in its biologic, chemical toxicological and medico-legal aspects. Nor is it satisfied to discuss principles and technic in a most comprehensive way but adds in great detail the interpretation of all the important tests. The American hematologist can study with profit some of the very practical demonstrations outlined here in regard to the collection of blood, both human and animal. Indeed, there is throughout the book a most unusual completeness and directness, such as is not often found in kindred American books. It is up-to-date. Inclusion of the most modern technics such as the Kahn precipitation test and others indicates that. Under the heading of agglutination is furnished certain information that might have been of great assistance to a Philadelphia judge who had trouble recently in fixing the paternity of a child that was claimed by two persons.

The illustrations are very good, although the color plates lack the usual gallic brilliance. The bibliographic references throughout the text are of great value and are unusually modern. The book is done in a semi-India paper and is fairly well bound. It can be readily recommended to blood analysts everywhere.

IVOR GRIFFITH.

THE "CHEMICAL AGE" CHEMICAL DICTIONARY, CHEMICAL TERMS, 1924. D. Van Nostrand Company, New York. 158 pp. $4.50 Net.

This book, the forerunner of a series of cognate works on "Organic Substances" and "Inorganic Substances," answers a demand that has been long existent. With chemical terms as with the terms of any expanding science there is not only rational growth but often a duplication of vocabulary and a progressive looseness and vagueness of terminology.

A dictionary, well-compiled and authoritative, serves to stabilize and standardize the terminology. That seems to be the mission of this book and that, we hope, will prove to be one of its accomplishments.

The scope of the dictionary is rather bold and broad, treating as it claims to, organic, inorganic, physical and bio-chemistry. That is a program of undertaking that knows no confines and yet within the two covers of this dictionary one must submit that the experts who compiled it have covered a most comprehensive field.

The style, the modes of cross-indexing and classifying, the printing, and the substantial paper are all judged to be of high character.

The proof-reading has been excellent. In all, this reviewer judges it to be all that the preface hopes it to be, namely, "A volume that will prove not only a novelty, but an indispensable companion for all those who are interested in fine chemistry or its application to industry."

IVOR GRIFFITH.